CF-420L

AEP Model

FM/SW/MW/LW RADIO CASSETTE-CORDER

SPECIFICATIONS

RADIO SECTION

Circuit:	Superheterodyne
Frequency Ranges:	FM 87.5 ~ 108 MHz (3.43 ~ 2.78 m) MW 530 ~ 1,605 kHz (566 ~ 187 m) SW 6 ~ 18 MHz (51 ~ 17 m) LW 150 ~ 350 kHz (2,000 ~ 857 m)
Intermediate Frequencies:	FM 10.7 MHz AM 455 kHz
Antennas:	FM, SW built-in telescopic (5 section, 87 cm long) MW, LW built-in ferrite bar (10 mm dia x 13 cm)
Sensitivity at 50 mW output:	FM 2.5 dB (1.3 μV) S/N 6 dB 13 dB (4.5 μV) S/N 30 dB MW 33 dB/m (45 μV/m) S/N 6 dB SW 7 dB (2.2 μV) S/N 6 dB LW 41 dB/m (110 μV/m) S/N 6 dB
Selectivity at 10 kHz off-resonance:	MW 29 dB at 1,400 kHz
Signal-to-Noise Ratio:	FM 62 dB at 98 MHz input level 55 dB (550 μV) MW 35 dB at 1,000 kHz input level 60 dB/m (1 mV/m) SW 44 dB at 10 MHz input level 44 dB (160 μV) LW 26 dB at 250 kHz input level 60 dB/m (1 mV/m)

TAPE RECORDER SECTION

Track:	Two-track mono
Record Bias Frequency:	Approximately 35 kHz
Frequency Response:	50 ~ 10,000 Hz
Wow and Flutter:	0.3 % (RMS) weighted
Signal-to-Noise Ratio:	42 dB
Overall Distortion:	3.5 %
Record/playback Head:	PP134-36 (250 Ω/1 kHz)
Erase Head:	EBF5-02B (ferrite)
Motor:	D-009G (DC governor)
Electret Condenser Microphone:	C-1002S
Automatic Shut-off Mechanism:	Operates in playback, record, fast forward and rewind modes by detecting reel spindle rotation and turns RADIO switch OFF.
Inputs:	MIC minimum level: −72 dB (0.2 mV) impedance: low LINE IN minimum level: −11 dB (0.22 V) impedance: 100 kΩ
Outputs:	MONITOR normal level: −19 dB (85 mV) with 8 Ω load load impedance: 8 Ω LINE OUT normal level: −1.5 dB (0.65 V) with 100 kΩ load load impedance greater than 10 kΩ
REC/PB Connector:	Input normal level: −33 dB (17.35 mV) impedance: 10 kΩ Output normal level: −1.5 dB (0.65 V) load impedance: 10 kΩ

GENERAL

Power Requirements:	AC 110, 127, 220, 240 V 50/60 Hz DC 6 V Battery size "D" x 4 Rechargeable battery BP-8 Car Battery DC 12 V by using SONY car battery cord DCC-127, DCC-126
Power Consumption:	AC 8 W
Speaker:	12 cm (5") dia, 20 Ω
Output Power:	2.7 W
Semiconductors:	1 FET, (included in electret condenser microphone), 18 transistors and 12 diodes
Dimensions:	340 (w) x 224 (h) x 103 (d) mm 13 7/16 (w) x 8 7/8 (h) x 4 1/16 (d) inches
Weight:	3.75 kg, 8 lb 4 oz (with battery)

SONY®

SERVICE MANUAL

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Hardware Nomenclature 50

When ordering replacement parts, use PART NUMBERS listed in Parts Lists or shown in EXPLODED VIEWS.
Parts List reference numbers should not be used.

In West Germany the fm frequency coverage should be within the range between 87.5 MHz and 108 MHz.
Adjust the frequency coverage by osc coil and osc trimmer (See FM Frequency Coverage Adjustment on page 29).

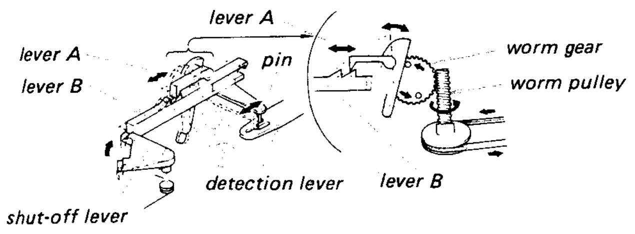
SECTION 1

OUTLINE

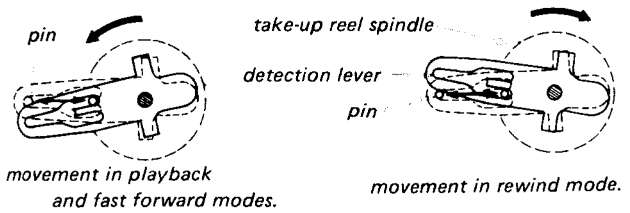
1-1. AUTOMATIC SHUT-OFF MECHANISM OPERATION

The automatic shut-off mechanism operates in record, playback, fast forward and rewind modes. Operation is shown step by step in numerical order.

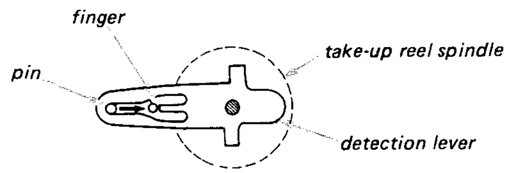
1 The operation in playback mode is explained as an example. When the forward button is depressed and locked, the brake lever is pushed and turns the power switch ON starting the motor.


lever A
lever A
lever B
pin
worm gear
worm pulley
detection lever
lever B
shut-off lever

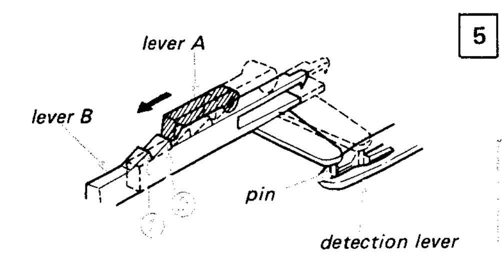
2 Turning force is transmitted as shown. Lever A, activated by the worm gear rotation, moves lever B back and forth as shown.


pin
take-up reel spindle
detection lever
pin
movement in playback and fast forward modes.
movement in rewind mode.

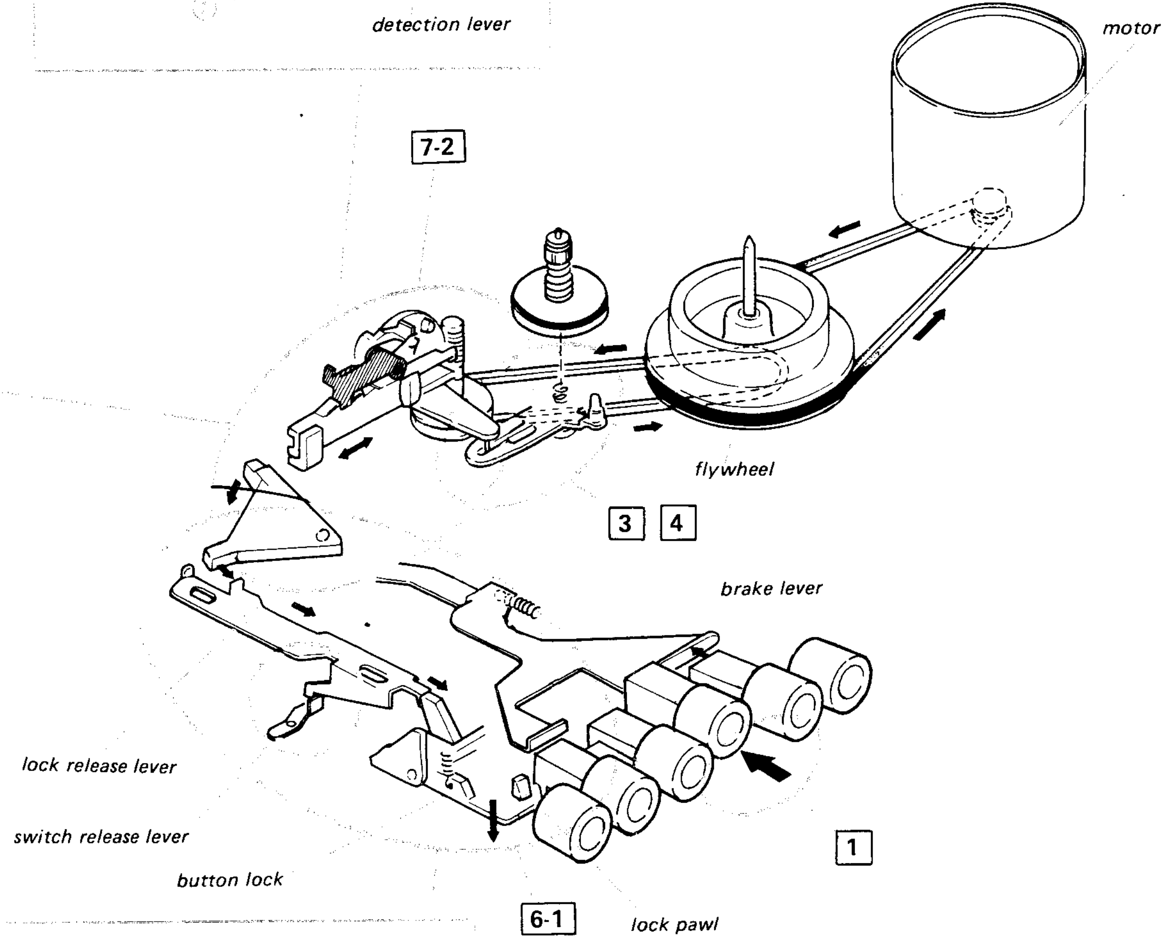
3 Take-up reel spindle rotates as long as there is some tape remaining on the supply reel. The rotational force on the detection lever, which is attached to the take-up reel spindle through a spring, permits movement of the pin as shown above in various modes.

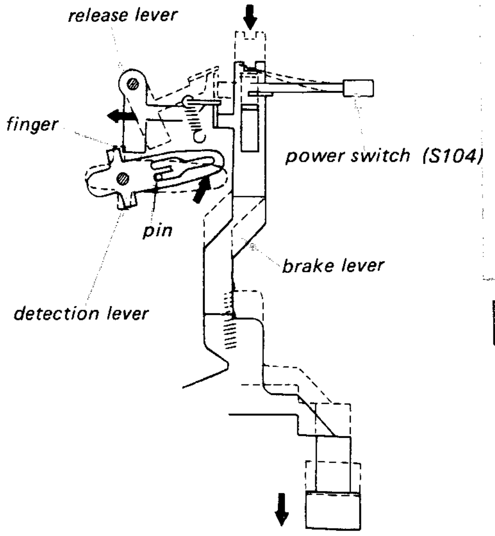

finger
pin
take-up reel spindle
detection lever

4 When tape supply ends, the rotational force on the detection lever stops and the pin movement is limited by the finger.


lever A
lever B
pin
detection lever

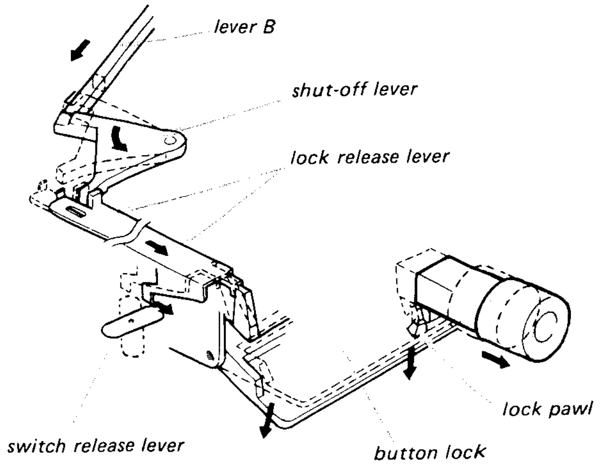
5 The finger holds the pin (lever B) forward far enough so that the pawl of lever A is able to push lever B at position 2.


7-2
motor
flywheel
3 4
brake lever
lock release lever
switch release lever
button lock
1
6-1
lock pawl

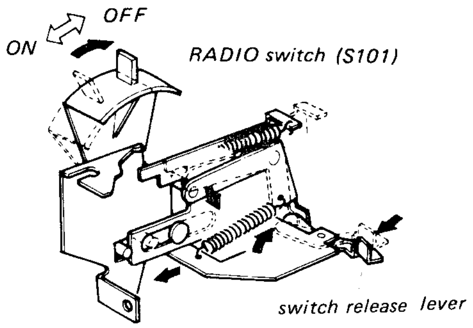

release lever
finger
power switch (S104)
pin
brake lever
detection lever

7-1 **RELEASE OPERATION (1)**

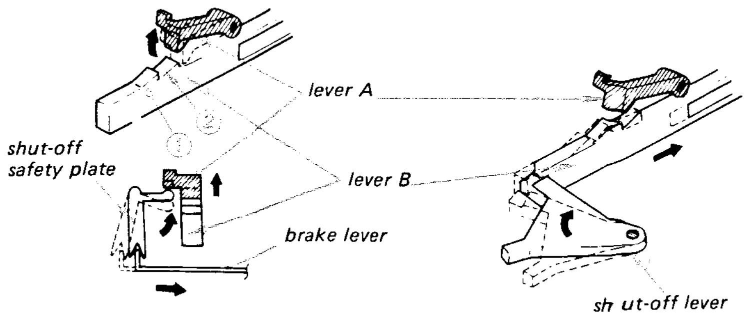
With the function button released, the brake lever moves in the direction shown by the arrow, the power switch (S104) turns OFF and the release lever hits the detection lever and releases the pin from the finger.


lever B
shut-off lever
lock release lever
lock pawl
switch release lever
button lock

6-1 Then lever B can push the shut-off lever far enough to release the button lock and the function button as shown.


OFF
ON
RADIO switch (S101)
switch release lever

6-2 RADIO switch (S101) is released as shown.


lever A
shut-off safety plate
lever B
brake lever
shut-off lever

7-2 **RELEASE OPERATION (2)**

By the brake lever movement, the shut-off safety plate releases lever A as shown.

1-2. CIRCUIT OPERATION

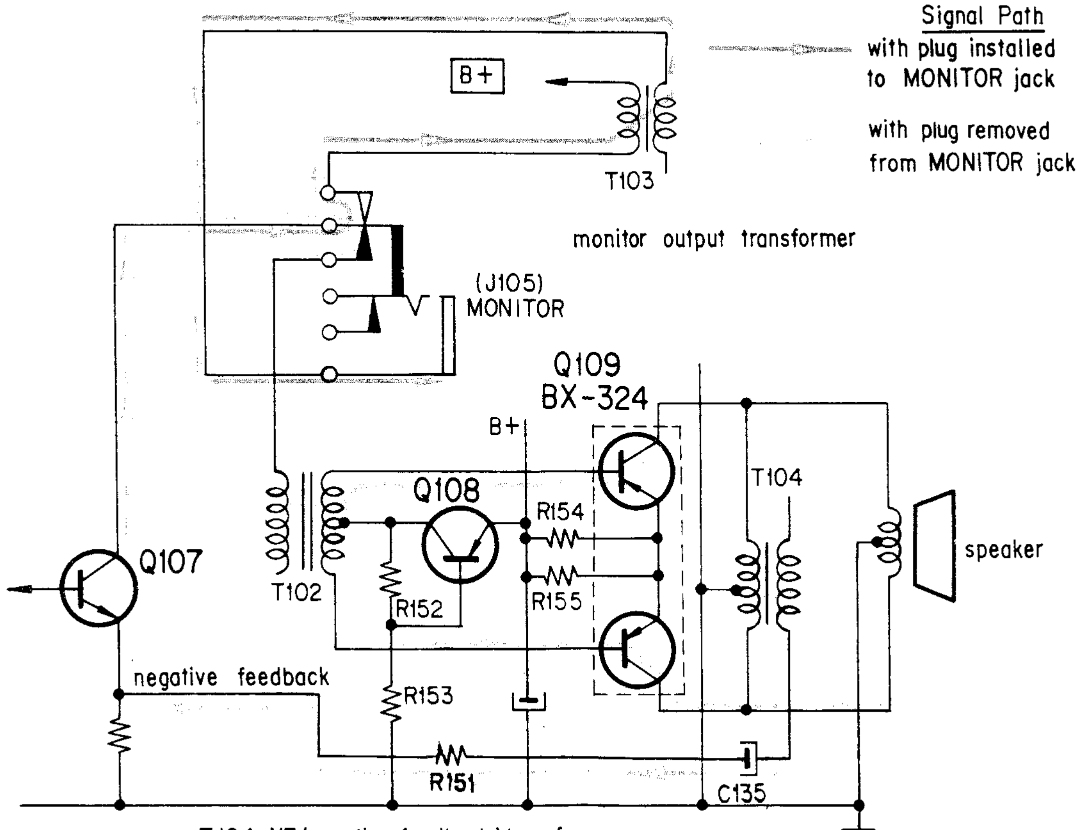
POWER AMPLIFIER

This power amplifier uses an OTL (output transformer-less) circuit featuring the following:

1. Low distortion and flat frequency response due to the elimination of an output transformer.
2. Same output power as SEPP (single-ended push-pull) OTL amplifier at half of SEPP OTL power supply voltage.
3. No need for balancing circuit, which is required for SEPP OTL circuit.

Q108:

To obtain high degree of circuit stability, Q108 neutralizes emitter current variations of Q109 caused by effects of ambient temperature, since Q108 and Q109 are germanium transistors having the same thermal response. When ambient temperature rises, emitter current of Q109 increases. At the same time, emitter current of Q108 increases and raises base voltage of Q109. Base-emitter voltage of Q109, therefore, decreases to reduce emitter current of Q109. When ambient temperature falls, the above function is reversed.

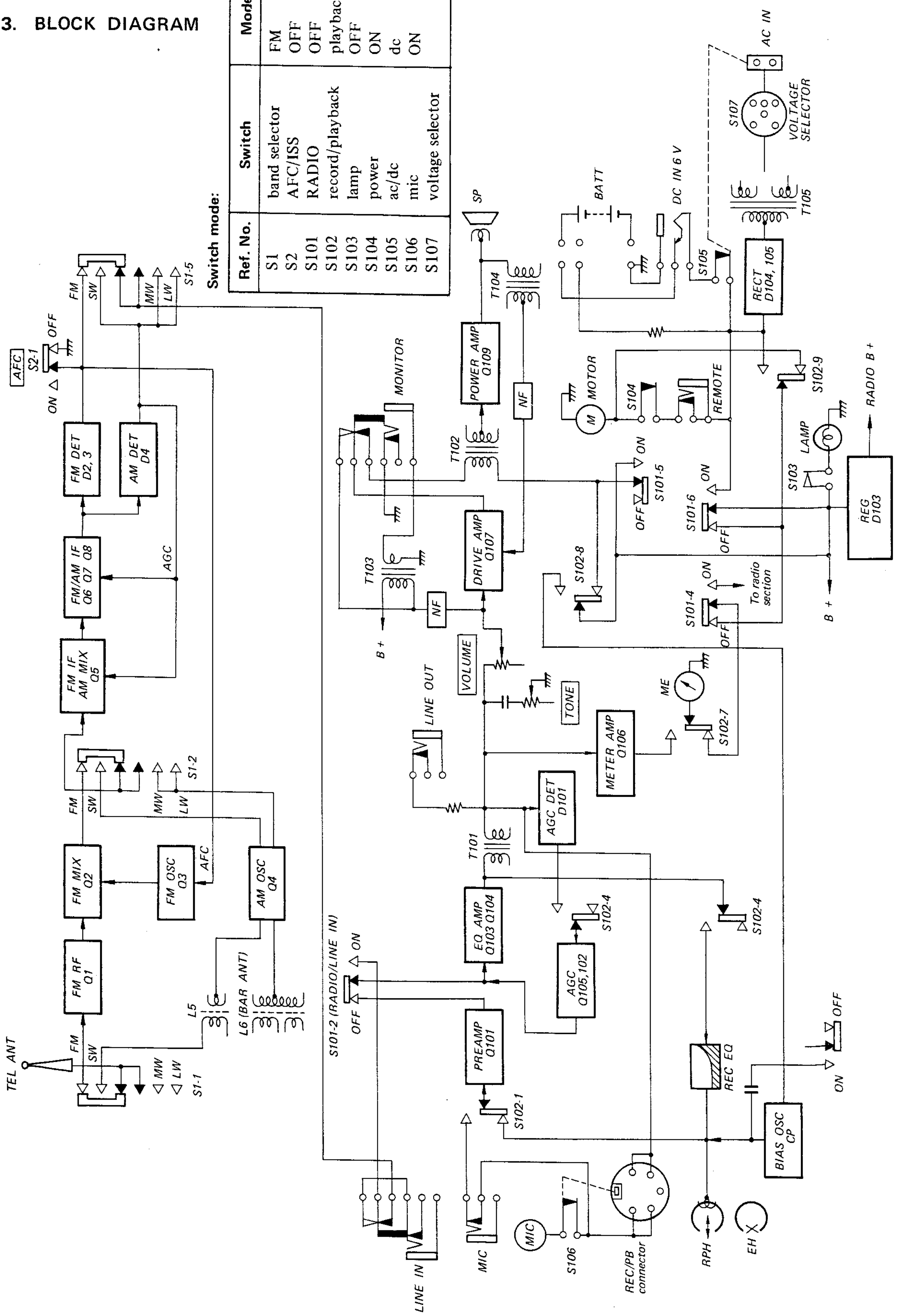

Signal Path
with plug installed to MONITOR jack
with plug removed from MONITOR jack
B+
T103
monitor output transformer
(J105) MONITOR
Q109 BX-324
B+
Q108
R154
R155
T104
speaker
Q107
T102
R152
negative feedback
R153
R151
C135

T104: NE (negative feedback) transformer

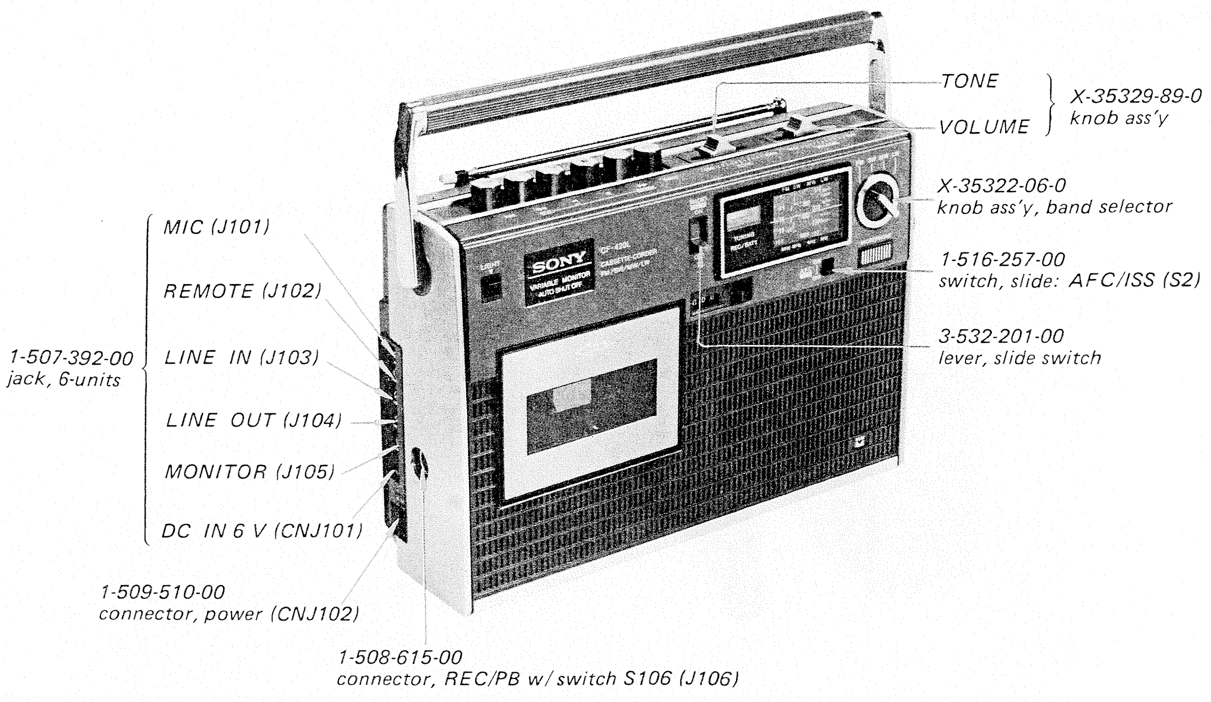
1-3. BLOCK DIAGRAM

Switch mode:

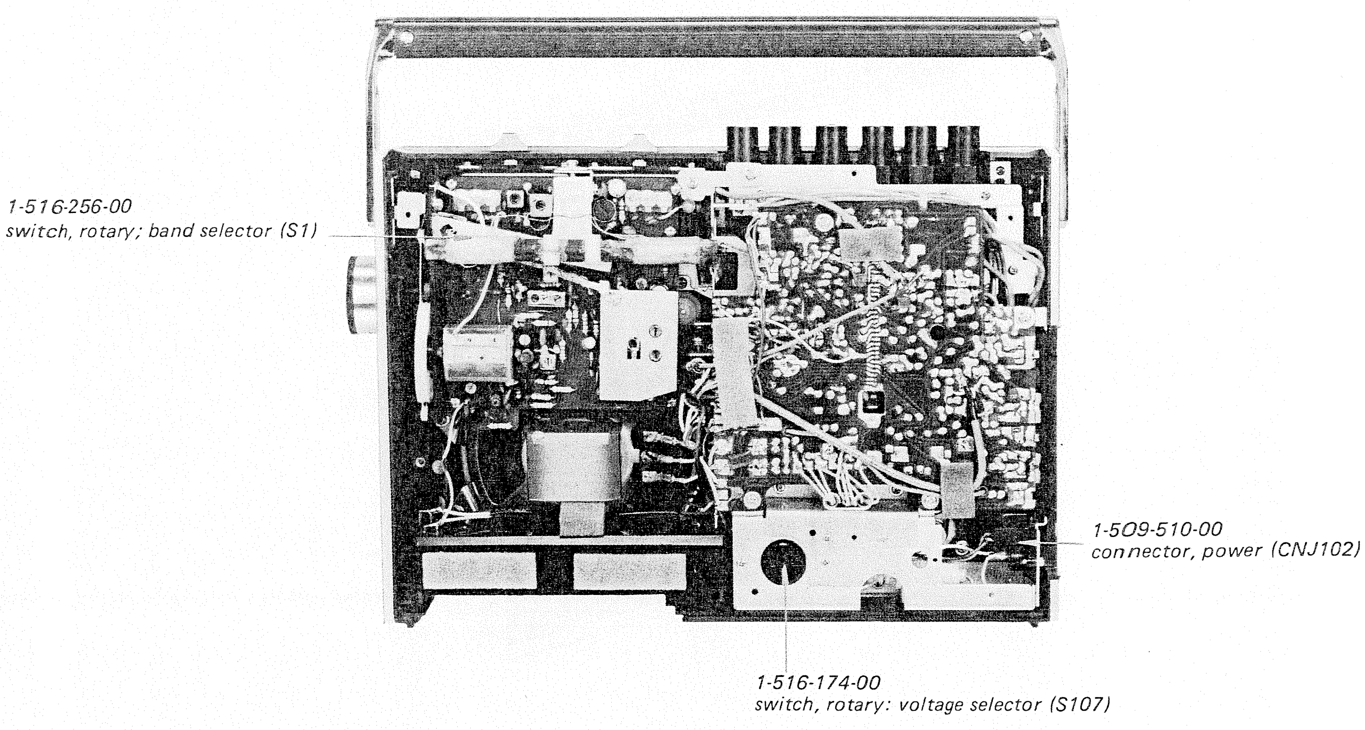
Ref. No.	Switch	Mode
S1	band selector	FM
S2	AFC/ISS	OFF
S101	RADIO	OFF
S102	record/playback	playback
S103	lamp	OFF
S104	power	ON
S105	ac/dc	dc
S106	mic	ON
S107	voltage selector	


TEL ANT
FM RF Q1
FM MIX Q2
FM OSC Q3
AM OSC Q4
FM IF AM MIX Q5
FM/AM IF Q6 Q7 Q8
FM DET D2, 3
AM DET D4
AFC S21
ON
OFF
FM SW MW LW S1-1
S1-2
S1-5
AFC
AGC
L5
L6 (BAR ANT)
S101-2 (RADIO/LINE IN)
LINE IN
MIC
S106
REC/PB connector
RPH
EH
PREAMP Q101
S102-1
EQ AMP Q103 Q104
T101
AGC Q105,102
S102-4
AGC DET D101
METER AMP Q106
ME
S102-7
LINE OUT
VOLUME
TONE
NF
T103
MONITOR
T102
DRIVE AMP Q107
POWER AMP Q109
T104
SP
S102-8
S101-4
To radio section
S101-5
S101-6
M MOTOR
S104
REMOTE
LAMP
S103
REG D103
RADIO B+
B+
S102-9
RECT D104, 105
T105
S107
VOLTAGE SELECTOR
AC IN
DC IN 6 V
BATT
S105
REC EQ
BIAS OSC CP

1-4. EXTERNAL VIEW


TONE
VOLUME
X-35329-89-0
knob ass'y
X-35322-06-0
knob ass'y, band selector
1-516-257-00
switch, slide: AFC/ISS (S2)
3-532-201-00
lever, slide switch
MIC (J101)
REMOTE (J102)
1-507-392-00
jack, 6-units
LINE IN (J103)
LINE OUT (J104)
MONITOR (J105)
DC IN 6 V (CNJ101)
1-509-510-00
connector, power (CNJ102)
1-508-615-00
connector, REC/PB w/switch S106 (J106)
SONY

1-5. INTERNAL VIEW

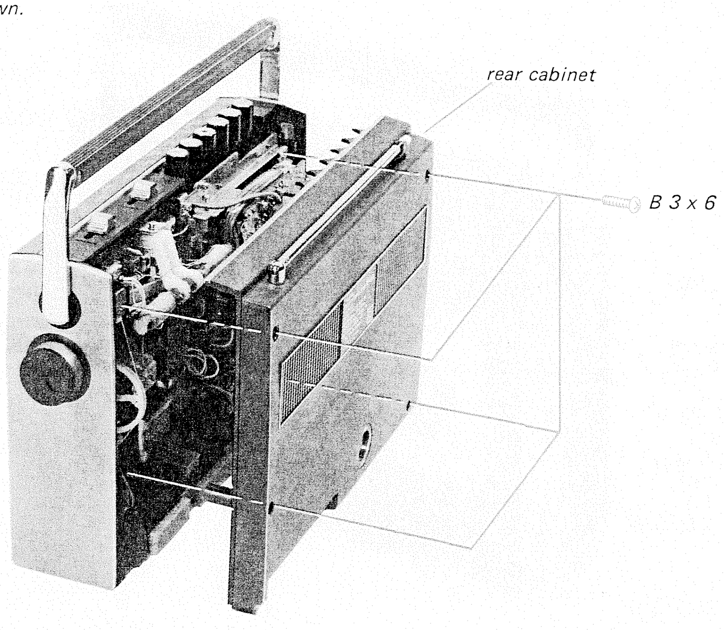

1-516-256-00
switch, rotary; band selector (S1)
1-509-510-00
connector, power (CNJ102)
1-516-174-00
switch, rotary: voltage selector (S107)

SECTION 2

DISASSEMBLY

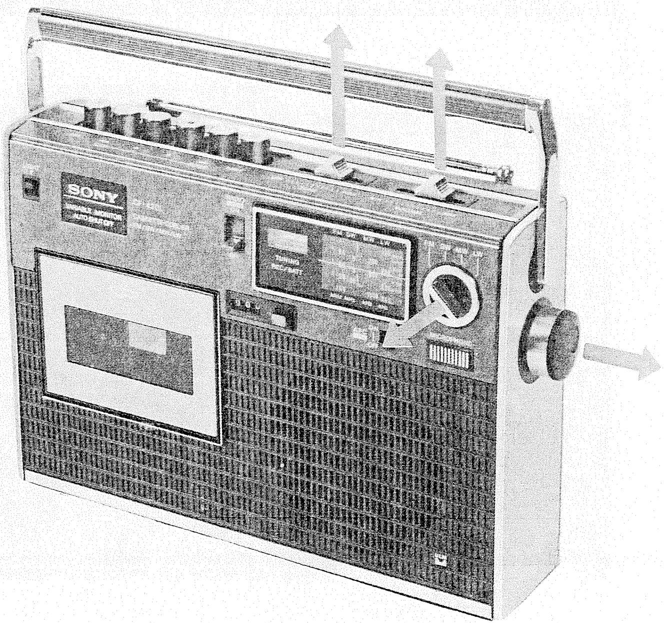
2-1. REAR CABINET REMOVAL

Remove four screws shown.

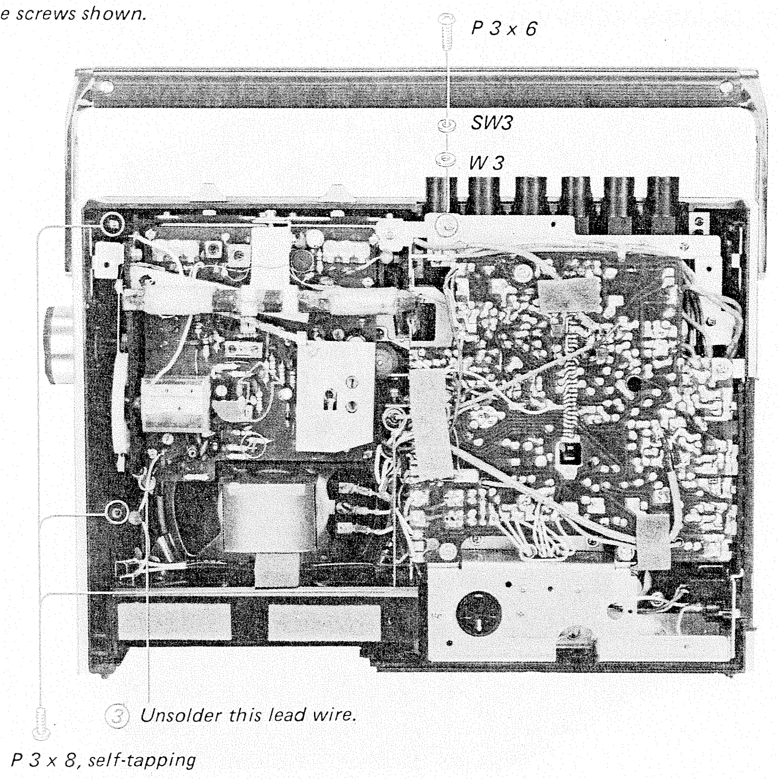

rear cabinet
B 3 x 6

2-2. RADIO CHASSIS REMOVAL

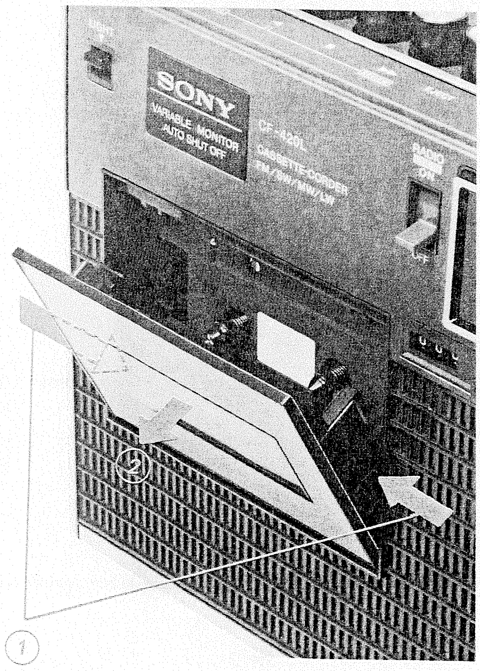
① *Remove these knobs.*



② *Remove five screws shown.*

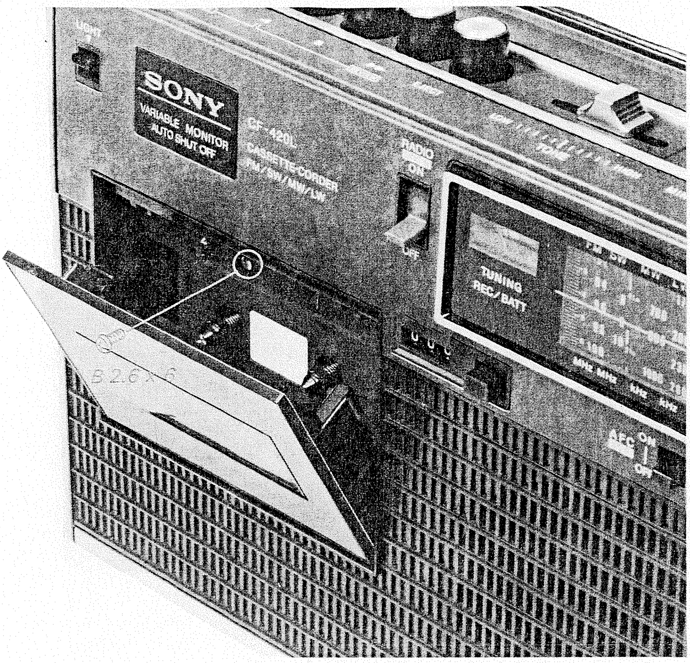

P 3 x 6
SW3
W 3
③ Unsolder this lead wire.
P 3 x 8, self-tapping

2-3. CASSETTE HOLDER REMOVAL


SONY
VARIABLE MONITOR
AUTO SHUT OFF
CF-420L
CASSETTE-CORDER
FM/SW/MW/LW
RADIO
ON
OFF
②
①

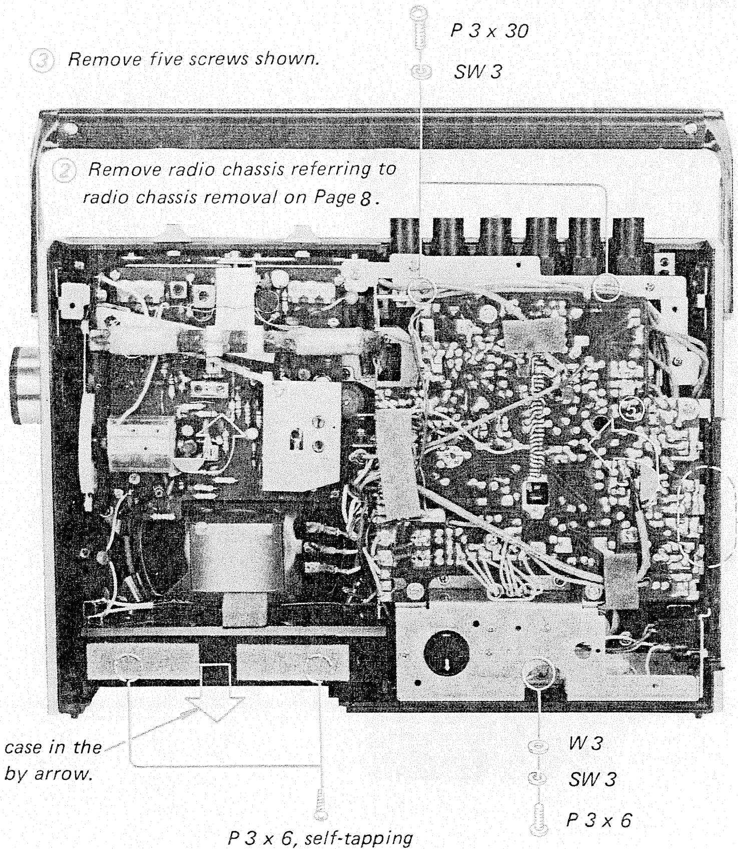
2-4. TAPE RECORDER CHASSIS REMOVAL

① Remove this screw.



③ Remove five screws shown.

② Remove radio chassis referring to radio chassis removal on Page 8.



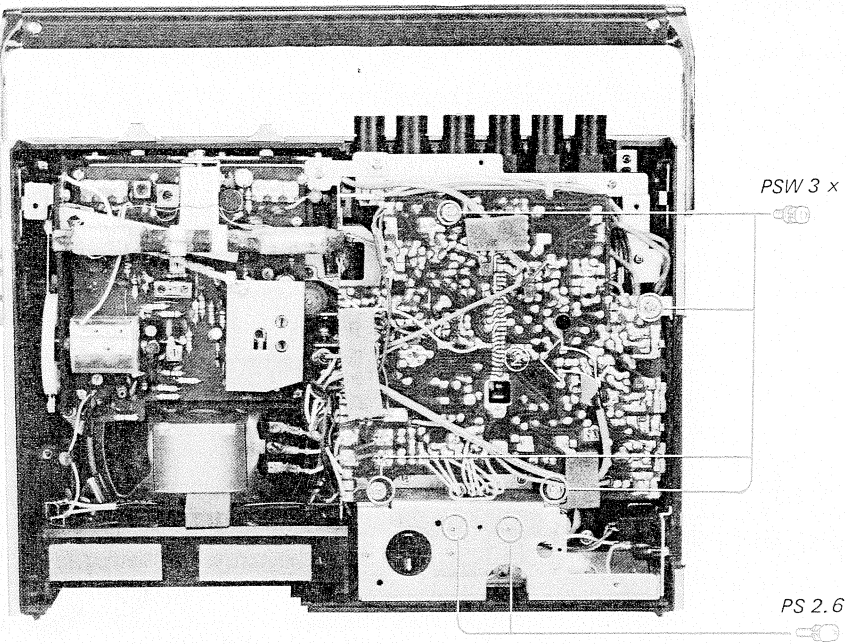
④ Remove battery case in the direction shown by arrow.

P 3 x 6, self-tapping (Remove from front side.)

Note: Carefully remove tape recorder circuit board in the direction shown by the arrow, since REC/PB connector securing screw is caught on cabinet.

2-5. TAPE RECORDER CIRCUIT BOARD REMOVAL

① Remove six screws shown.

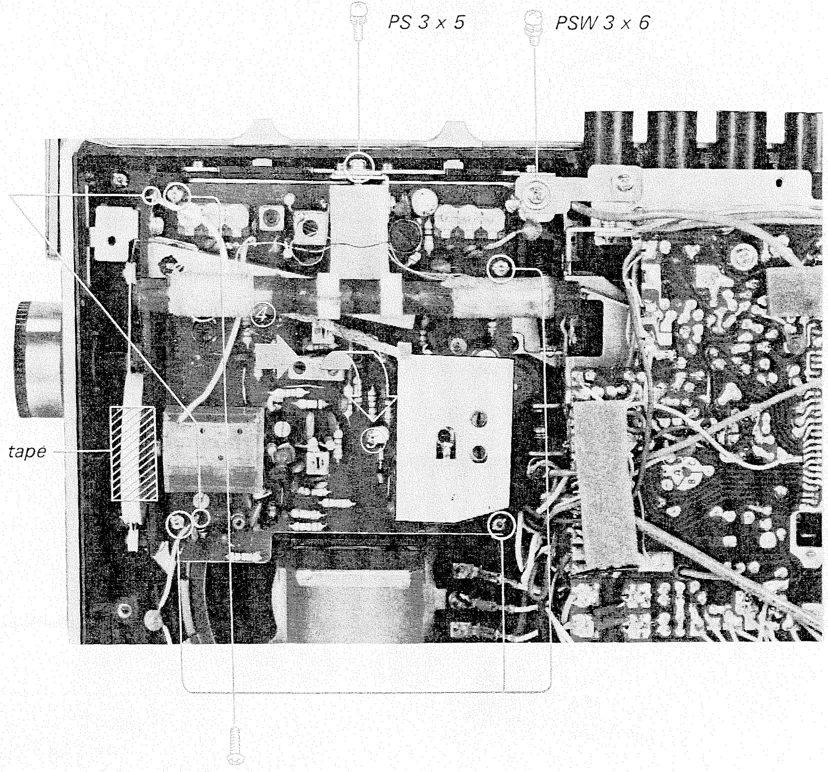

PSW 3 x 6
PS 2.6 x 6

2-6. RADIO CIRCUIT BOARD REMOVAL

① Remove six screws shown.

② Unsolder two lead wires.

③ Put a piece of cellophane tape to fix dial cord.

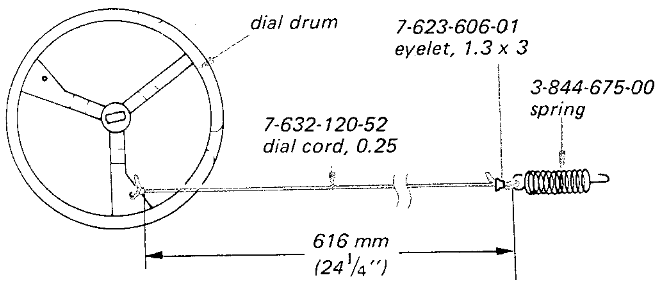

PS 3 x 5
PSW 3 x 6
④

P 3 x 8, self-tapping

2-7. DIAL CORD STRINGING

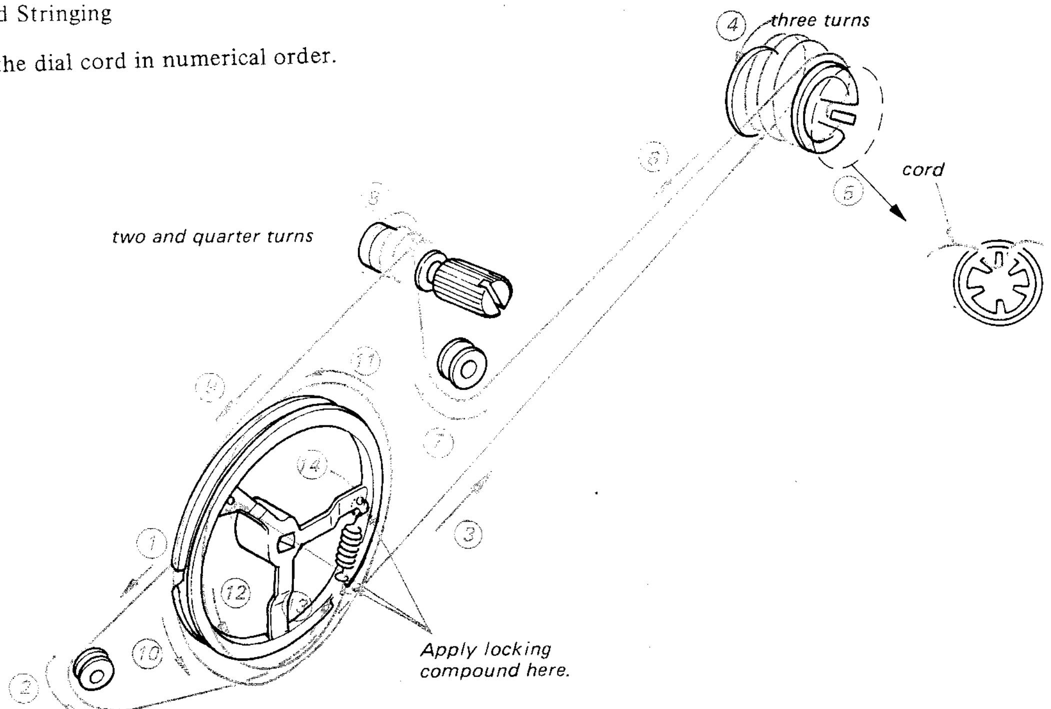
Remove rear cabinet. (See Page 8)
Remove radio chassis. (See Page 8 and 9)

1. Dial Cord Assembly


dial drum
7-623-606-01
eyelet, 1.3 x 3
3-844-675-00
spring
7-632-120-52
dial cord, 0.25
616 mm
(24¼")

2. Dial Cord Stringing

String the dial cord in numerical order.


④ three turns
cord
⑤
⑥
⑧
two and quarter turns
⑨
⑪
⑦
⑭
③
①
⑫
⑬
⑩
②

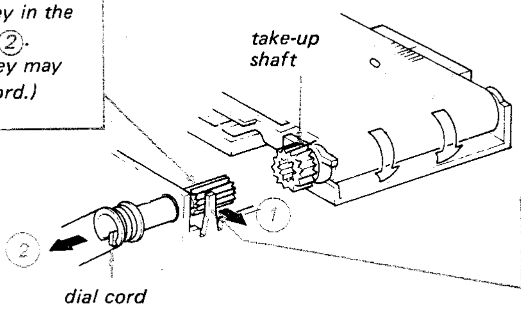
Apply locking compound here.

dial drum: fully counterclockwise position

3. Dial Film Adjustment

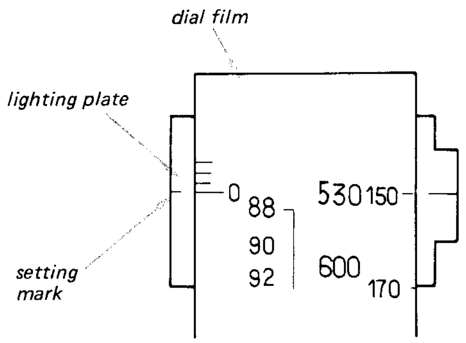
dial drum: fully counterclockwise position

② Remove this stringing pulley in the direction shown by arrow ②. (Excessive pull of this pulley may cause to remove the dial cord.)


take-up
shaft
①
②
dial cord

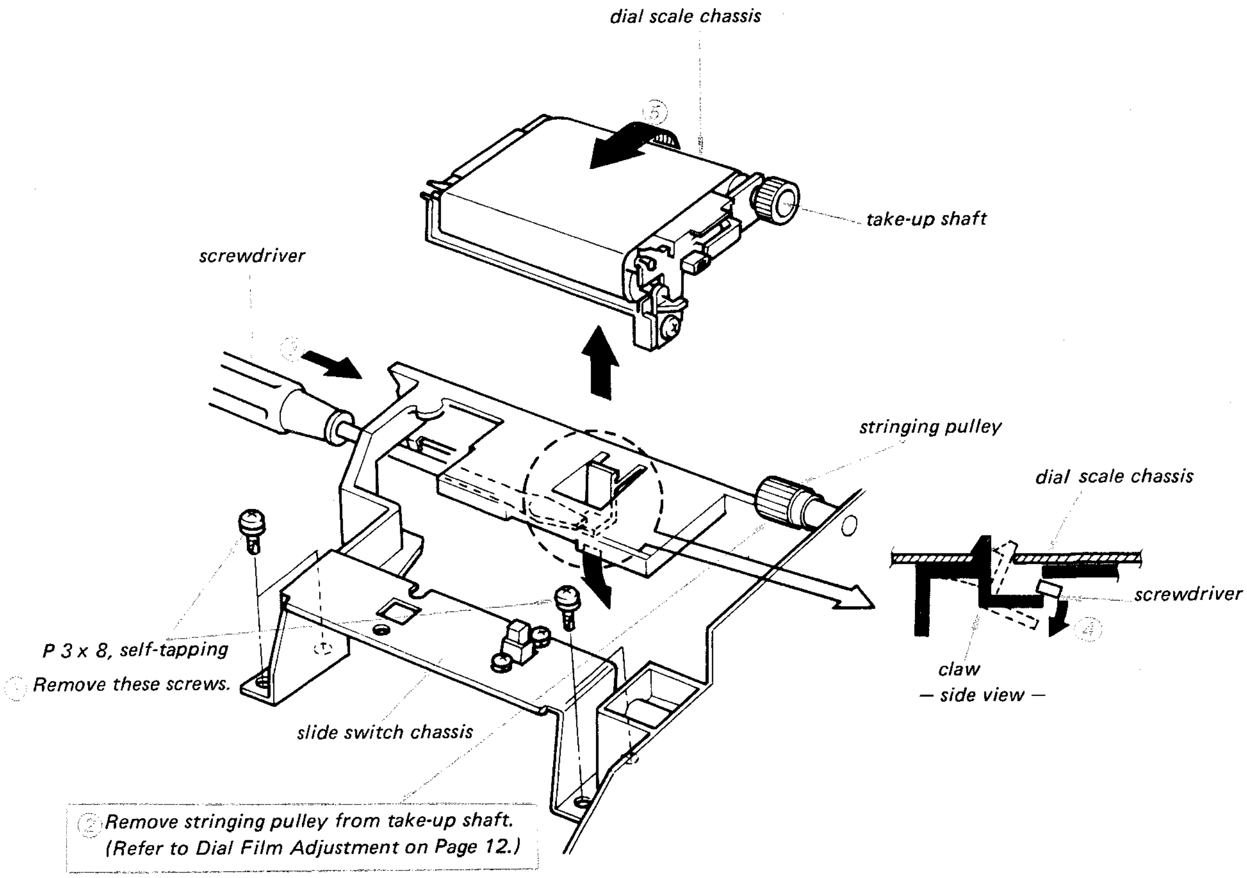
① Push this claw in the direction shown by arrow ①. (Strong force to push this claw may cause damage.)

③ *Turn take-up shaft so that "O" scale on the dial film comes at setting mark on lighting plate.*


dial film
lighting plate
setting mark
0
88
90
92
530
600
150
170

④ *Insert the stringing pulley to take-up shaft.*

2-8. DIAL SCALE CHASSIS REMOVAL


dial scale chassis
⑤
take-up shaft
screwdriver
③
stringing pulley
dial scale chassis
screwdriver
④
claw
– side view –
P 3 x 8, self-tapping
①
slide switch chassis

① *Remove these screws.*

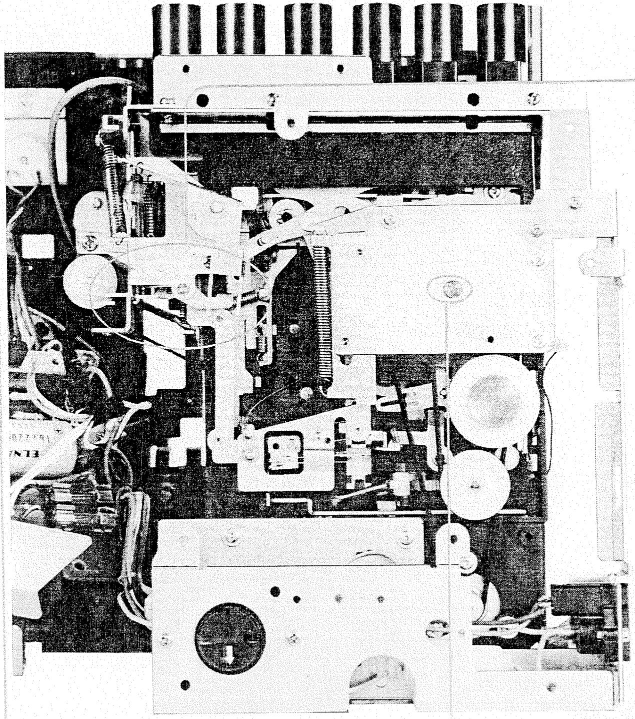
② *Remove stringing pulley from take-up shaft. (Refer to Dial Film Adjustment on Page 12.)*

SECTION 3

ADJUSTMENTS

3-1. MECHANICAL ADJUSTMENTS

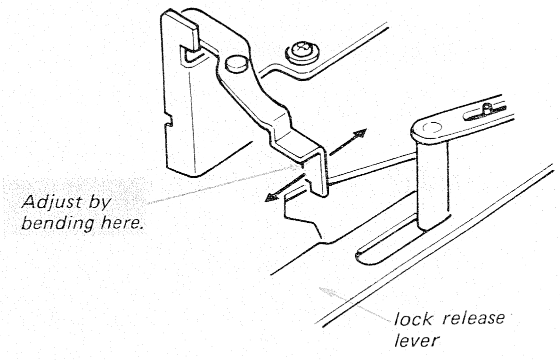
Remove tape recorder chassis. (See Page 10)



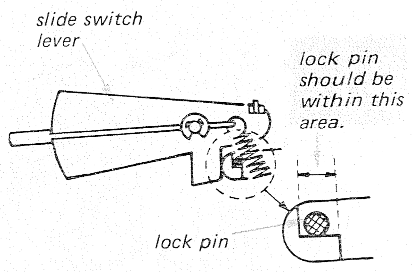
RADIO Switch Timing Adjustment
– rewind mode –

[1] *Turn RADIO switch ON.*

[2] *When shut-off mechanism operates at the tape end, ensure that rewind button releases after RADIO switch turns OFF. If necessary, adjust as follows:*

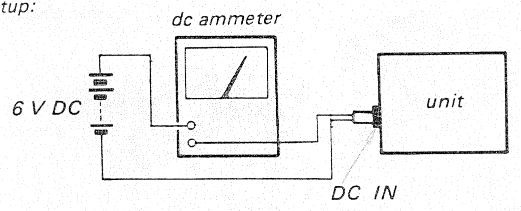

Adjust by bending here.
lock release lever

Note: After the adjustment, ensure that lock pin positions as shown below.


slide switch lever
lock pin should be within this area.
lock pin

Flywheel Thrust Play Adjustment
– playback mode –

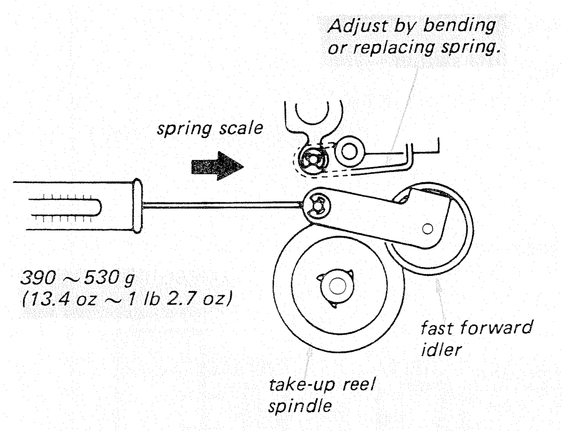
1. *Setup:*


dc ammeter
6 V DC
unit
DC IN

2. *Position unit horizontally with flywheel side up.*
3. *Loosen thrust screw for sufficient flywheel play.*
4. *Tighten the screw until current suddenly increases, then loosen the screw 1/4 turn.*

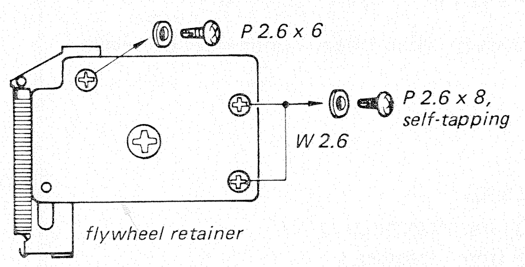
Fast Forward Idler Pressure Adjustment

– fast forward mode –

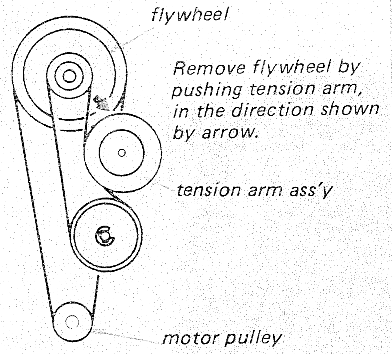

Adjust by bending or replacing spring.
spring scale
390 ~ 530 g
(13.4 oz ~ 1 lb 2.7 oz)
fast forward idler
take-up reel spindle

When adjusting, proceed as follows:

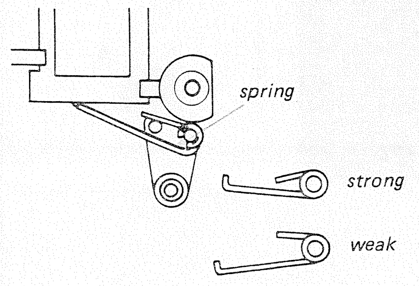
[1] Remove Flywheel Retainer


P 2.6 x 6
P 2.6 x 8, self-tapping
W 2.6
flywheel retainer

[2] Remove Flywheel


flywheel
Remove flywheel by pushing tension arm, in the direction shown by arrow.
tension arm ass'y
motor pulley

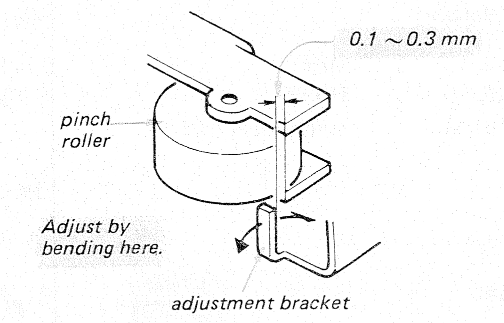
[3] Adjust by bending or replacing spring.

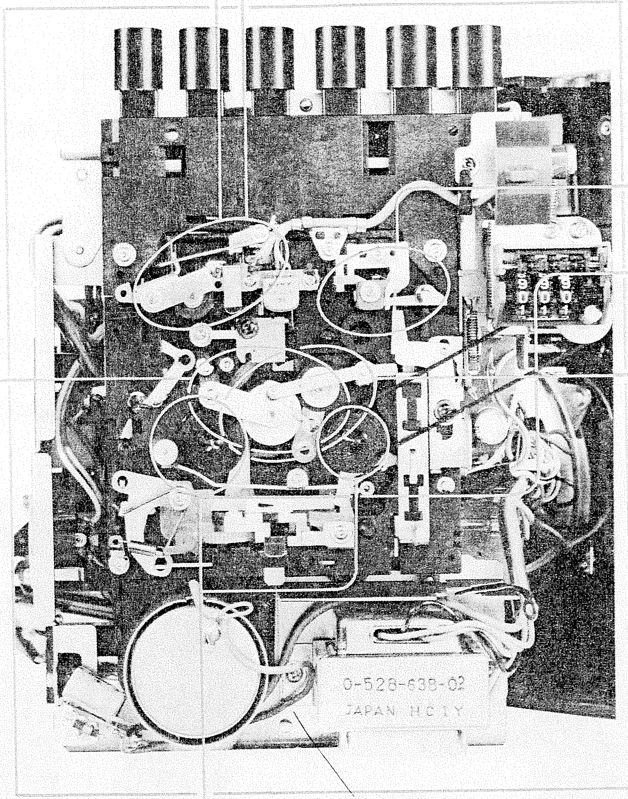

spring
strong
weak

After the adjustment, clean the belts with alcohol moistend swab and install them without twist.

Pinch Roller Timing Adjustment

– playback mode –


0.1 ~ 0.3 mm
pinch roller
Adjust by bending here.
adjustment bracket


0-528-638-02
JAPAN

Torque Measurement

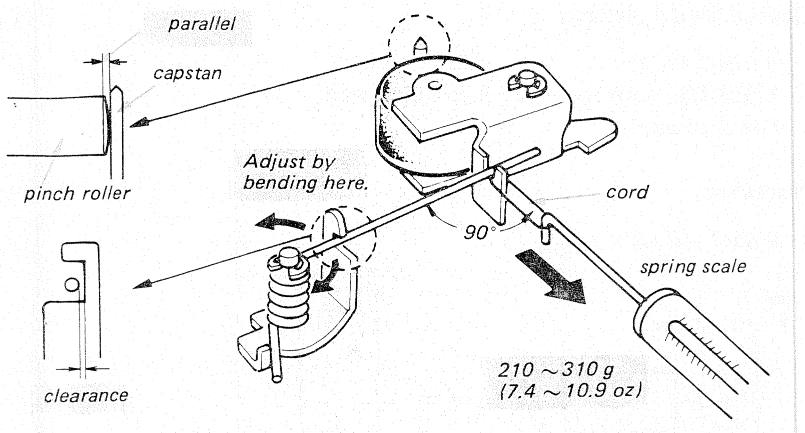
Mode	Torque meter	Meter reading
Playback	* CQ-101	25 ~ 50 g·cm
	General torque meter	35 ~ 60 g·cm (0.49 ~ 0.83 oz·inch)
fast forward	* CQ-201	50 ~ 100 g·cm
	General torque meter	50 ~ 100 g·cm (0.7 ~ 1,39 oz·inch)
rewind	* CQ-201	50 ~ 100 g·cm
	General torque meter	50 ~ 100 g·cm (0.7 ~ 1.39 oz·inch)

* SONY cassette type torque meter

Part No.	Model Name
Y-20926-01-1	CQ-101
Y-20926-11-1	CQ-201

Pinch Roller Pressure Adjustment

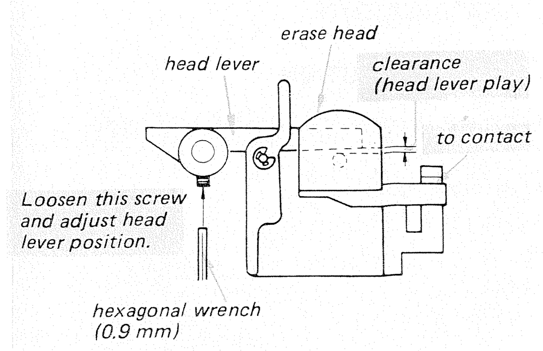
– playback mode –


parallel
capstan
pinch roller
Adjust by bending here.
cord
90°
spring scale
210 ~ 310 g
(7.4 ~ 10.9 oz)
clearance

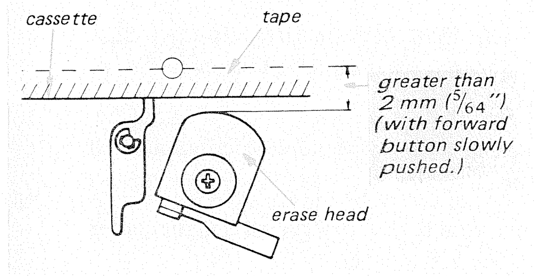
Note: The pressure should be measured just when the pinch roller contacts the capstan after being separated.

Head Lever Adjustment

– record mode –

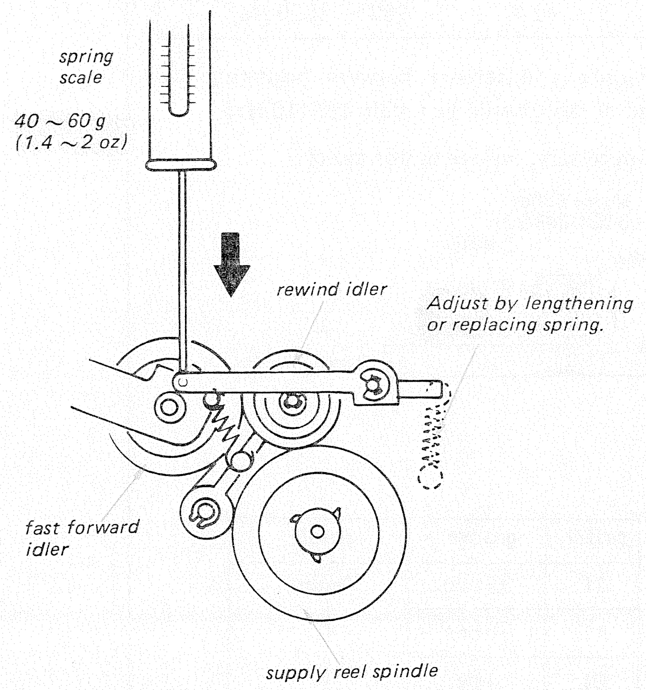

erase head
head lever
clearance
(head lever play)
to contact
Loosen this screw and adjust head lever position.
hexagonal wrench
(0.9 mm)

– playback mode –


cassette
tape
greater than 2 mm (5/64")
(with forward button slowly pushed.)
erase head

Rewind Idler Pressure Adjustment

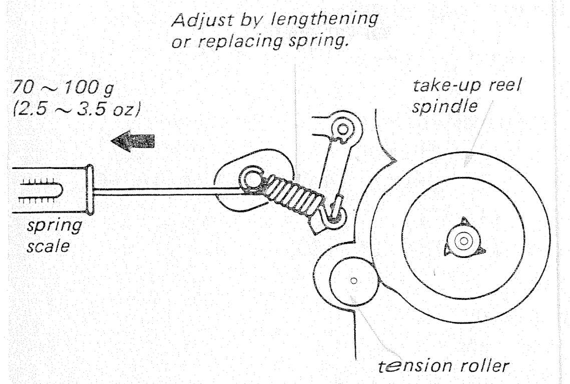
– rewind mode –


spring scale
40 ~ 60 g
(1.4 ~ 2 oz)
rewind idler
Adjust by lengthening or replacing spring.
fast forward idler
supply reel spindle

Note: The pressure should be measured just when the rewind idler contacts the supply reel spindle after being separated.

Tension Roller Pressure Adjustment

– playback mode –


Adjust by lengthening or replacing spring.
70 ~ 100 g
(2.5 ~ 3.5 oz)
take-up reel spindle
spring scale
tension roller

Note: The pressure should be measured just when the tension roller contacts the take-up reel spindle after being separated.

3-2. ELECTRICAL ADJUSTMENTS AND MEASUREMENTS

PRECAUTION

1. Clean the following parts with alcohol moistened swab:
   - Record/Playback head
   - Erase head
   - Capstan
   - Pinch roller
   - Rubber belts
   - Idlers
2. Demagnetize record/playback head with a head demagnetizer. (Do not bring head demagnetizer close to erase head, and do not use magnetized screwdriver for adjustments).
3. After the adjustments, apply locking compound to adjusted parts.
4. Adjustments should be performed in the order listed in this service manual.
5. Adjustments and measurements should be performed with rated power supply voltage unless otherwise specified.

TAPE RECORDER SECTION

Test Equipment/Tools Required

audio oscillator (af osc)
VTVM
digital frequency counter
400 Hz bandpass filter
resistors 10 Ω, 300 Ω, 580 Ω, 600 Ω, 10 kΩ, 80 kΩ, 100 kΩ
speed checker (SONY LFM-30)
attenuator
distortion meter
SONY test tapes
  P-4-A81 (6.3 kHz, −10 dB)
  P-4-L81 (333 Hz, 0 dB)
  SPC-4 (1 kHz, 0 dB)
  WS-48 (3 kHz, 0 dB)
blank tape cassette (completely erased)
wow meter

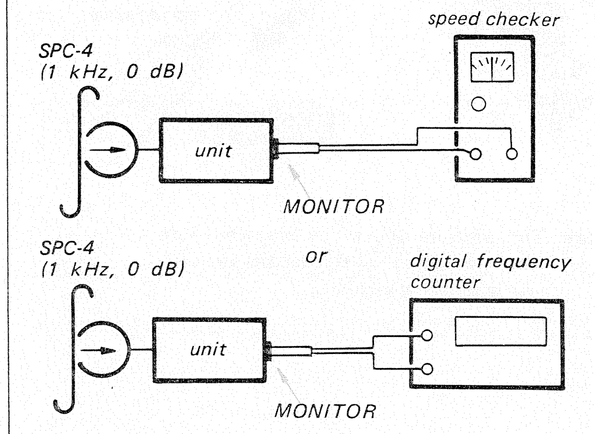
1. Tape Speed Adjustment

Control/Switch Setting:

RADIO switch:	OFF
VOLUME control:	mechanical mid
Power source:	6 V DC

Procedure:

1. Mode: playback

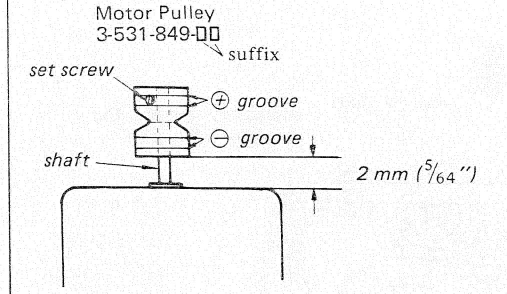

speed checker
SPC-4
(1 kHz, 0 dB)
unit
MONITOR
SPC-4
(1 kHz, 0 dB)
or
digital frequency counter
unit
MONITOR

Specification:

speed checker	digital frequency counter
−2 ~ +2 %	980 ~ 1020 Hz

Frequency difference between beginning and end of tape should be within 1 % (10 Hz).

2. If necessary, replace motor pulley.


Motor Pulley
3-531-849-□□
suffix
set screw
⊕ groove
⊖ groove
shaft
2 mm (5/64")

suffix	groove	speed
21	⊕ two	faster
11	⊕ one	
01	none	
31	⊖ one	
41	⊖ two	slower

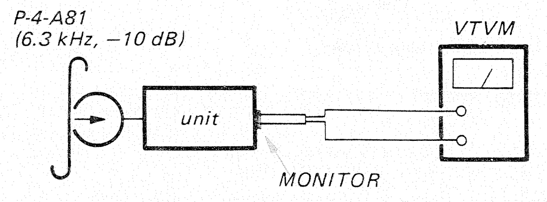
2. Record/playback Head Azimuth Adjustment

Control/Switch Setting:

RADIO switch:	OFF
TONE control:	HIGH
VOLUME control:	mechanical mid

Procedure:

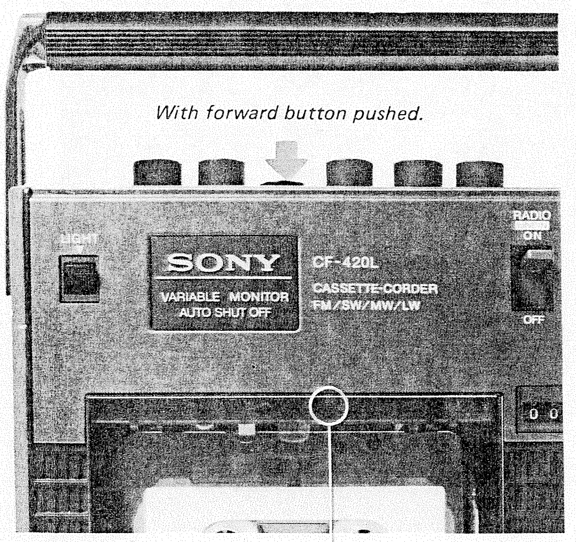
1. Mode: playback


P-4-A81
(6.3 kHz, −10 dB)
VTVM
unit
MONITOR

2. Turn adjusting screw for highest VTVM reading.

Note: Several peaks may appear, take the highest.

Adjustment Location:


With forward button pushed.
SONY
VARIABLE MONITOR
AUTO SHUT OFF
CF-420L
CASSETTE-CORDER
FM/SW/MW/LW
RADIO
ON
OFF
LIGHT

azimuth adjusting screw

Note: Remove the cassette holder for azimuth adjustment. (See Page 9.)

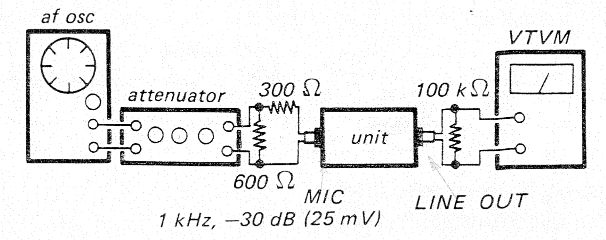
3. AGC Recovery Time Adjustment

Control/Switch Setting :

RADIO switch :	OFF
Bias osc:	OFF (See Adjustment Location)

Procedure:

1. Mode: record

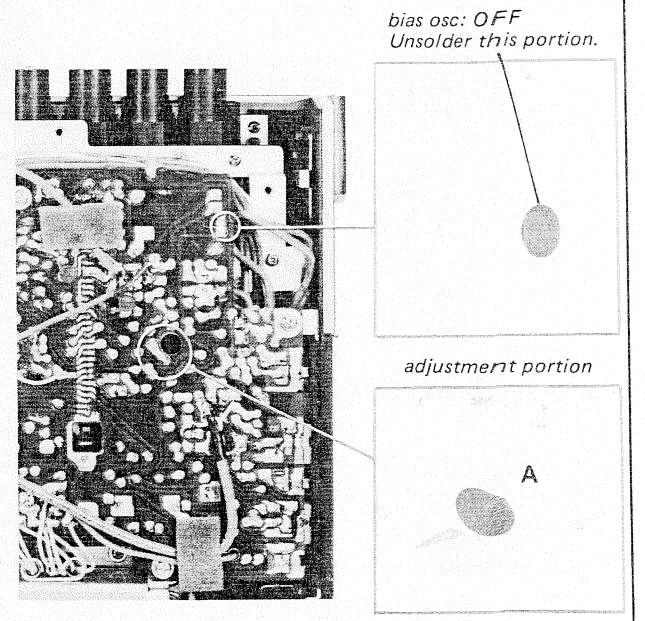

af osc
VTVM
attenuator
300 Ω
100 kΩ
unit
600 Ω
MIC
1 kHz, −30 dB (25 mV)
LINE OUT

2. Quickly decrease input signal to −60 dB (0.77 mV).
3. Measure recovery time when output level increases 10 dB.

Specification:

60 ± 40 seconds.
If necessary, unsolder portion A.
(Recovery time increases.)

Adjustment Location


bias osc: OFF
Unsolder this portion.
adjustment portion
A

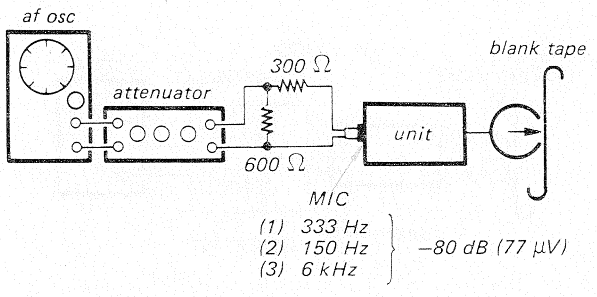
4. Bias Adjustment

Control/Switch Setting:

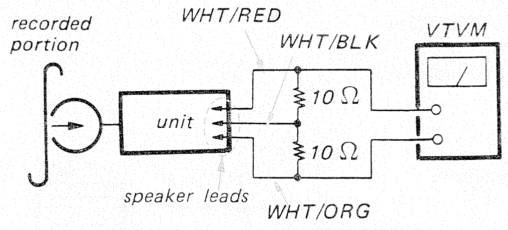
RADIO switch:	OFF
TONE control:	HIGH

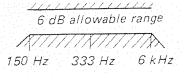
Procedure:

1. Mode . record

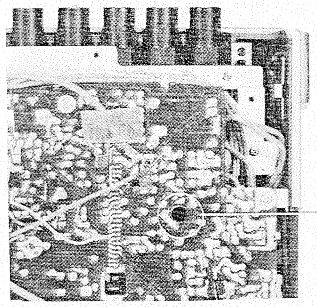

af osc
attenuator
300 Ω
600 Ω
blank tape
unit
MIC
(1) 333 Hz
(2) 150 Hz
(3) 6 kHz
−80 dB (77 µV)

2. Mode: playback


recorded portion
WHT/RED
WHT/BLK
VTVM
unit
10 Ω
10 Ω
speaker leads
WHT/ORG

Recorded signal	VTVM reading
333 Hz	Adjust VOLUME control for −10 dB (0.25 V)
150 Hz	 6 dB allowable range 150 Hz 333 Hz 6 kHz
6 kHz	

If necessary, adjust by soldering.



R125, 126, 127, 128 connections

Connect	Resistance value (Ω)	6 kHz level
3 and 4	100	decrease
1 and 4	177	↓
2 and 4	250	
2 and 3	280	
1 and 2	340	
open	430	increase

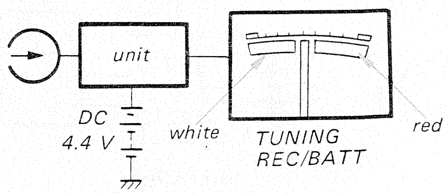
5. REC/BATT Meter Adjustment

Control/Switch Setting:

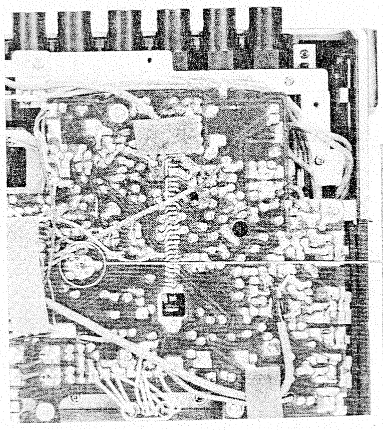
RADIO switch:	OFF
Power Source:	4.4 V DC

Procedure:

1. Mode: playback
Ensure that the pointer is at boundary between white and red zone.


unit
DC
4.4 V
white
TUNING
REC/BATT
red

If necessary, adjust by soldering.



R158, 159, 160 connections

Connect	Resistance value (Ω)	Meter reading
B and C	40.3 k	red zone
A and C	43 k	↕
open	46.9 k	white zone

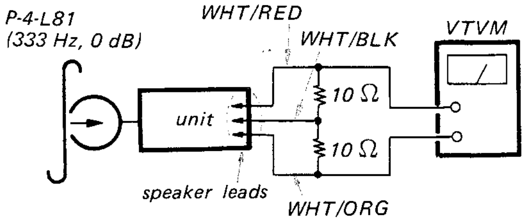
6. Playback Frequency Response Measurement

Control/Switch Setting:

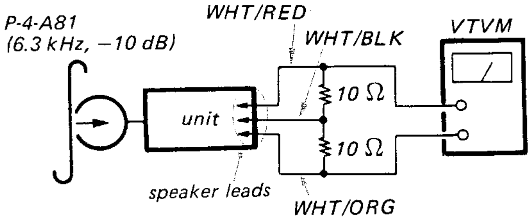
RADIO switch:	OFF
TONE control:	HIGH

Procedure:

1. Mode: playback


P-4-L81
(333 Hz, 0 dB)
WHT/RED
WHT/BLK
VTVM
unit
10 Ω
10 Ω
speaker leads
WHT/ORG

2. Adjust VOLUME control for 0 dB (0.775 V) VTVM reading.
3. Mode: playback


P-4-A81
(6.3 kHz, −10 dB)
WHT/RED
WHT/BLK
VTVM
unit
10 Ω
10 Ω
speaker leads
WHT/ORG

Specification .

−12 ~ −4 dB (0.19 ~ 0.49 V)

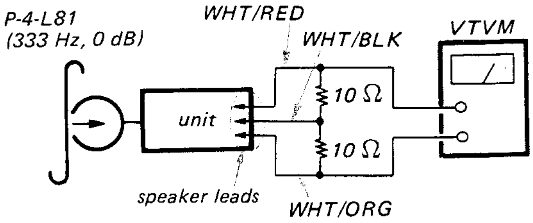
7. Playback Signal-to-Noise Ratio Measurement

Control/Switch Setting :

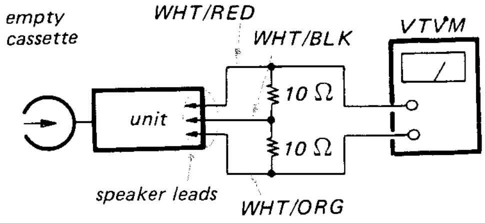
RADIO switch:	OFF
TONE control:	HIGH

Procedure:

1. Mode: playback


P-4-L81
(333 Hz, 0 dB)
WHT/RED
WHT/BLK
VTVM
unit
10 Ω
10 Ω
speaker leads
WHT/ORG

2. Adjust VOLUME control for 0 dB (0.775 V) VTVM reading.
3. Mode: playback


empty
cassette
WHT/RED
WHT/BLK
VTVM
unit
10 Ω
10 Ω
speaker leads
WHT/ORG

Specification:

Less than −46 dB (3.9 mV) for household current
Less than −48 dB (3.1 mV) for battery

Note: Perform this adjustment for both household current and battery.

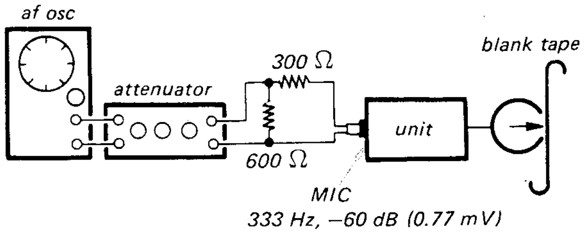
8. Overall Signal-to-Noise Ratio Measurement

Control/Switch Setting:

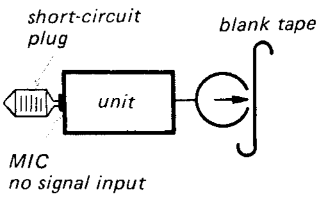
RADIO switch:	OFF
TONE control:	HIGH

Procedure:

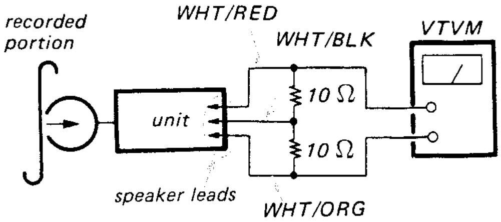
1. Mode: record


af osc
attenuator
300 Ω
600 Ω
unit
blank tape
MIC
333 Hz, −60 dB (0.77 mV)

2. Mode: record


short-circuit plug
blank tape
unit
MIC
no signal input

3. Mode: playback


recorded portion
WHT/RED
WHT/BLK
VTVM
unit
10 Ω
10 Ω
speaker leads
WHT/ORG

Recorded signal	VTVM reading
333 Hz	Adjust VOLUME control for 0 dB (0.775 V)
no signal	Less than −36 dB (12 mV) for household current Less than −38 dB (9.5 mV) for battery

Note: Perform this adjustment for both household current and battery.

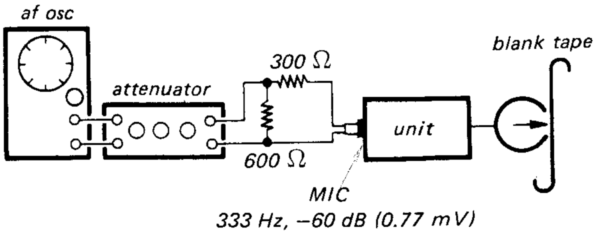
9. Overall Maximum Output Measurement

Control/Switch Setting:

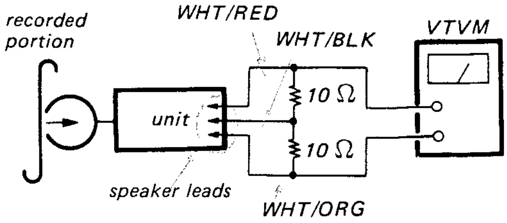
RADIO switch:	OFF
TONE control:	HIGH
VOLUME control:	MAX

Procedure:

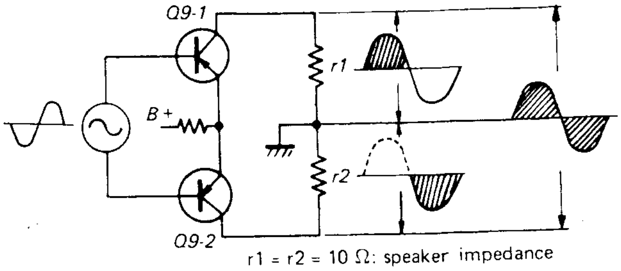
1. Mode: record


af osc
attenuator
300 Ω
600 Ω
unit
blank tape
MIC
333 Hz, −60 dB (0.77 mV)

2. Mode: playback


recorded portion
WHT/RED
WHT/BLK
VTVM
unit
10 Ω
10 Ω
speaker leads
WHT/ORG

Note:


Q9-1
r1
B+
r2
Q9-2

r1 = r2 = 10 Ω: speaker impedance

This unit uses 20 Ω impedance speaker having a center tap. Due to class B amplifier, Q9-1 amplifies negative half cycles of input signals and Q9-2 amplifies positive half cycles. Positive half cycles of output voltage are obtained across r1 and negative half cycles across r2. Full-wave output voltage across (r1 + r2) is voltage obtained alternately across r1 and across r2. Load resistance, therefore, is 10 Ω.

$$\text{Output power (W)} = \frac{(\text{voltage across r1 + r2})^2}{10\ (\Omega)}$$

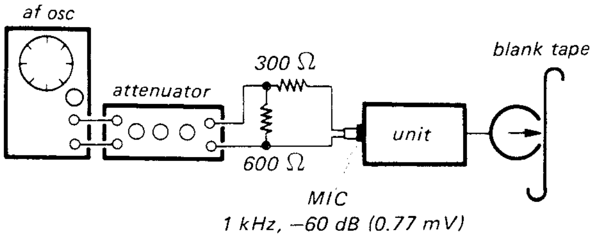
10. Overall Distortion Measurement

Control/Switch Setting:

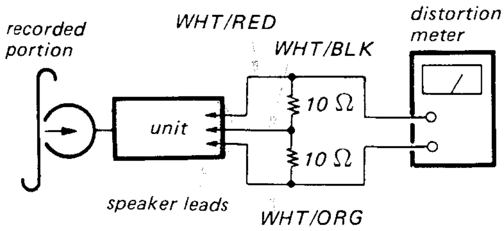
RADIO switch: OFF
TONE control: HIGH

Procedure:

1. Mode: record


af osc
attenuator
300 Ω
600 Ω
unit
blank tape
MIC
1 kHz, –60 dB (0.77 mV)

2. Mode: playback


recorded portion
WHT/RED
WHT/BLK
distortion meter
unit
10 Ω
10 Ω
speaker leads
WHT/ORG

Specification:

less than 8 %

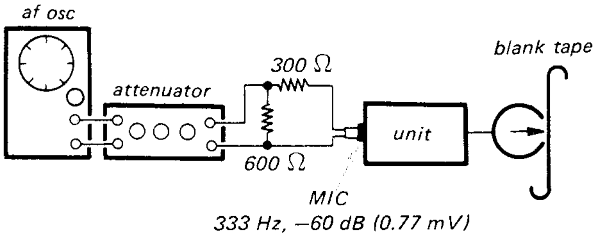
11. Overall LINE OUT Level Measurement

Control/Switch Setting:

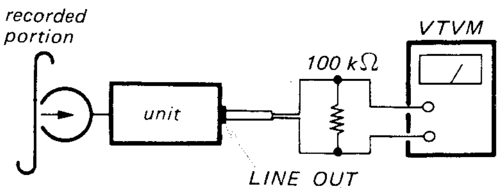
RADIO switch: OFF
VOLUME control. MIN

Procedure:

1. Mode: record


af osc
attenuator
300 Ω
600 Ω
unit
blank tape
MIC
333 Hz, –60 dB (0.77 mV)

2. Mode: playback


recorded portion
VTVM
100 kΩ
unit
LINE OUT

Specification:

–3.8 ~ +3.8 dB (0.47 ~ 1.2 V)

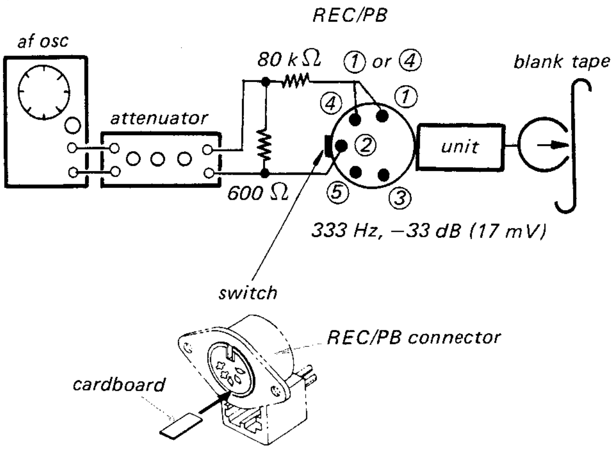
12. Overall REC/PB Connector Level Measurement

Control/Switch Setting:

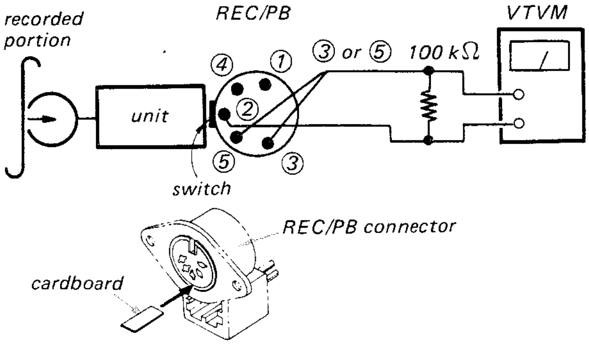
RADIO switch:	OFF
TONE control:	HIGH
VOLUME control:	MIN

Procedure:

1. Mode: record


REC/PB
af osc
80 kΩ
① or ④
blank tape
attenuator
④
①
②
unit
600 Ω
⑤
③
333 Hz, −33 dB (17 mV)
switch
REC/PB connector
cardboard

2. Mode: playback


recorded portion
REC/PB
VTVM
④
①
③ or ⑤
100 kΩ
unit
②
⑤
③
switch
REC/PB connector
cardboard

Specification:

−3.8 dB ~ +2 dB (0.47 ~ 0.95 V)

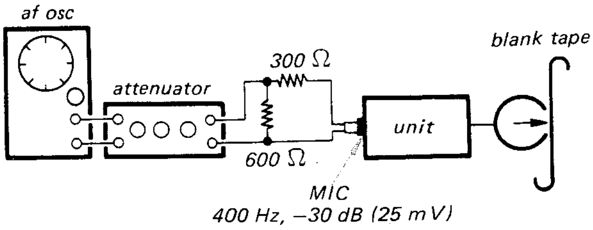
13. Erase Ratio Measurement:

Control/Switch Setting

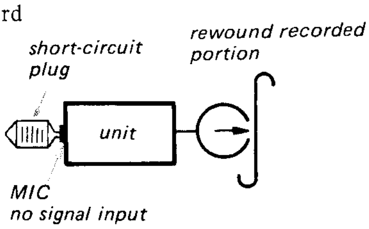
RADIO switch:	OFF
TONE control:	HIGH

Procedure:

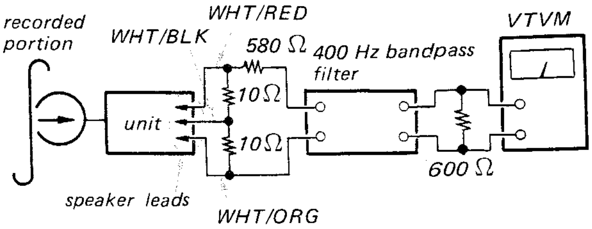
1. Mode: record


af osc
blank tape
300 Ω
attenuator
unit
600 Ω
MIC
400 Hz, −30 dB (25 mV)

2. Rewind half of the recorded portion.
3. Mode: record


short-circuit plug
rewound recorded portion
unit
MIC
no signal input

4. Mode: playback


recorded portion
WHT/RED
WHT/BLK
580 Ω
400 Hz bandpass filter
VTVM
10Ω
unit
10Ω
600 Ω
speaker leads
WHT/ORG

Recorded signal	VTVM reading
400 Hz	Adjust VOLUME control for 0 dB (0.775 V) VTVM reading.
no signal	Less than −60 dB (0.77 mV).

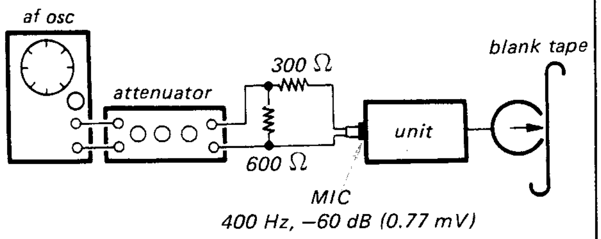
14. Cross-talk Measurement (between tracks)

Control/Switch Setting:

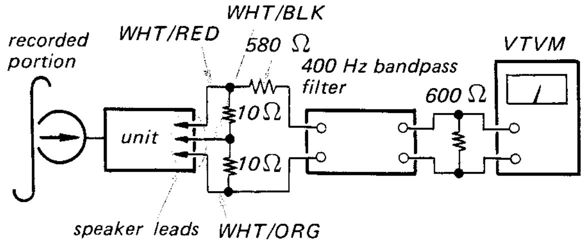
RADIO switch: OFF
TONE control: HIGH

Procedure:

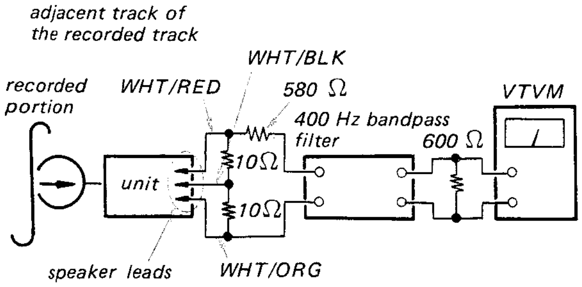
1. Mode: record


af osc
attenuator
300 Ω
600 Ω
unit
blank tape
MIC
400 Hz, −60 dB (0.77 mV)

2. Mode: playback


recorded portion
WHT/RED
WHT/BLK
580 Ω
400 Hz bandpass filter
600 Ω
VTVM
unit
10Ω
10Ω
speaker leads
WHT/ORG

3. Adjust VOLUME control for 0 dB (0.775 V) VTVM reading.
4. Turn the cassette over.
5. Mode: playback


adjacent track of the recorded track
recorded portion
WHT/RED
WHT/BLK
580 Ω
400 Hz bandpass filter
600 Ω
VTVM
unit
10Ω
10Ω
speaker leads
WHT/ORG

Specification:

less than −55 dB (1.4 mV)

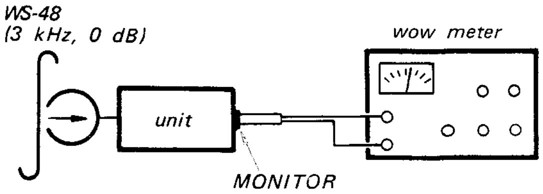
15 Wow and Flutter Measurement

Control/Switch Setting:

RADIO switch: OFF
VOLUME control: mechanical mid
POWER source: 6 V

Procedure:

1. Mode: playback


WS-48
(3 kHz, 0 dB)
unit
wow meter
MONITOR

Specification:

less than 0.38 % (RMS)

Note: Measure wow and flutter for beginning and end portion of tape (WS-48).

RADIO SECTION

Test Equipment/Tools Required:

- AM rf signal generator
- FM rf signal generator
- VTVM
- volt-ohm meter
- loop antenna
- resistors 10 Ω
- capacitors 0.01 μF, 10 pF

Note: 1. Modulation
AM: 30 % amplitude modulation by 400 Hz signal.
FM: ± 22.5 kHz frequency modulation by 400 Hz signal.

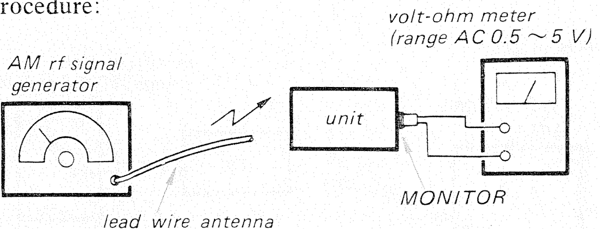
2. AM, FM rf signal generator output level should be as low as possible for following adjustments.

1. AM I-f Alignment

Control/Switch Setting:

RADIO switch:	ON
band selector switch:	MW
VOLUME control:	MAX

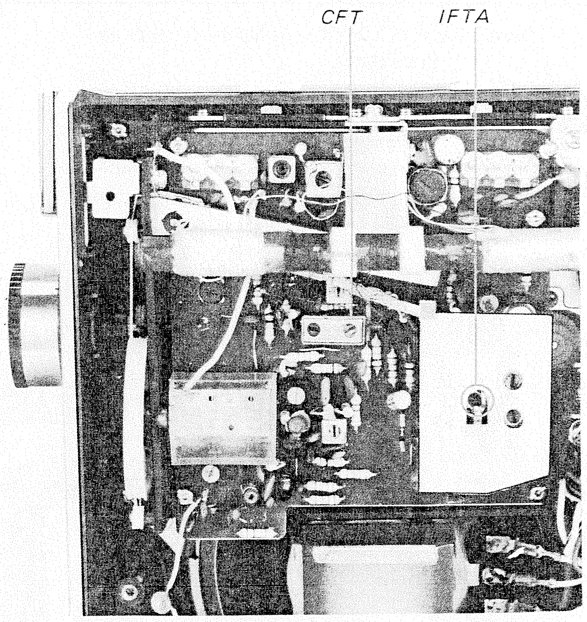
Procedure:


volt-ohm meter
(range AC 0.5 ~ 5 V)
AM rf signal generator
unit
MONITOR
lead wire antenna

Step	AM rf signal generator frequency	Tuning knob	Adjust	Volt-ohm meter reading
1	468 kHz	Detune broad-casting signals.	CFT IFTA	maximum

Note: Adjust CFT and IFTA alternately.

Adjustment Location:

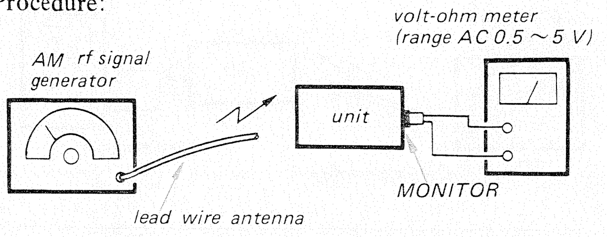


2. MW Frequency Coverage and Tracking Adjustments

Control/Switch Setting:

RADIO switch:	ON
band selector switch:	MW
VOLUME control:	MAX

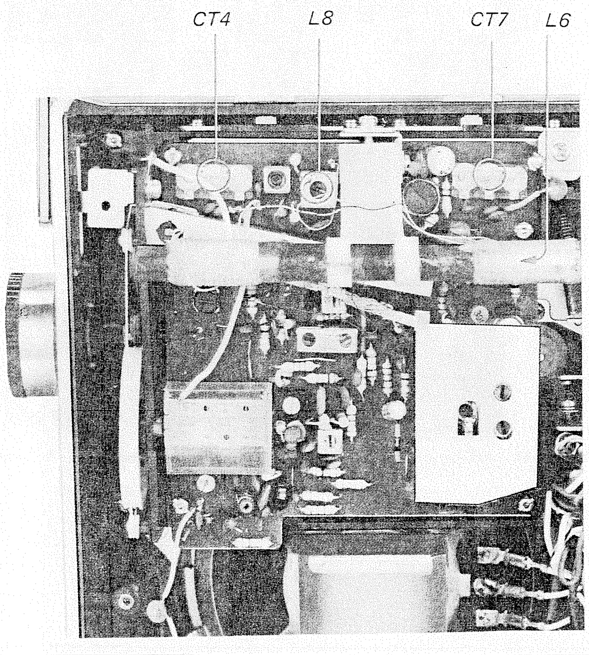
Procedure:


volt-ohm meter
(range AC 0.5 ~ 5 V)
AM rf signal generator
unit
MONITOR
lead wire antenna

Adjustment	Step	AM rf signal generator frequency	Tuning knob	Adjust	Volt-ohm meter reading
Frequency coverage	1	520 kHz	fully counter-clockwise	L8	maximum
	2	1,680 kHz	fully clockwise	CT7	maximum
Tracking	1	620 kHz	tune to 620 kHz	L6	maximum
	2	1,400 kHz	tune to 1,400 kHz	CT4	maximum

Note: Repeat Tracking Adjustment steps two or three times.

Adjustment Location:

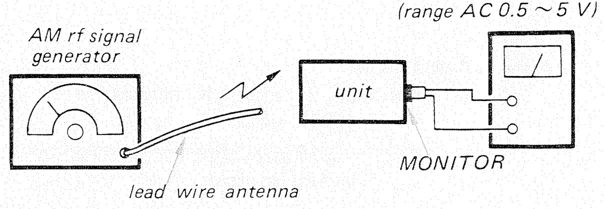

CT4
L8
CT7
L6

3. LW Frequency Coverage and Tracking Adjustments

Control/Switch Setting:

RADIO switch:	ON
band selector switch:	LW
VOLUME control:	MAX

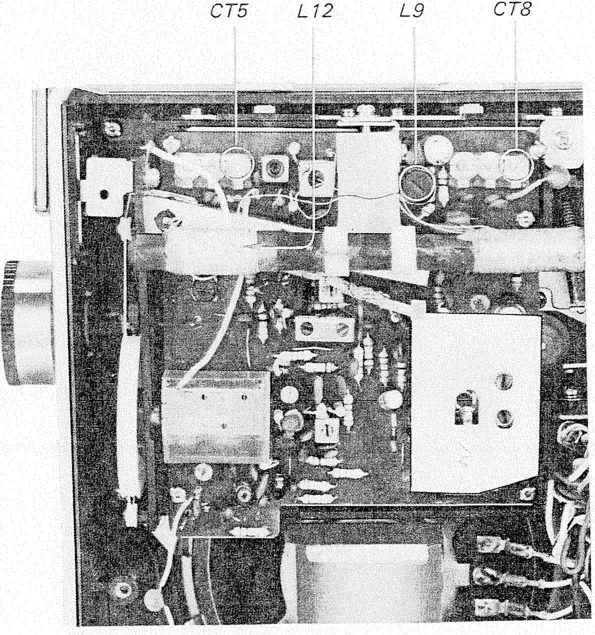
Procedure:


volt-ohm meter
(range AC 0.5 ~ 5 V)
AM rf signal generator
unit
MONITOR
lead wire antenna

Adjustment	Step	AM rf signal generator frequency	Tuning knob	Adjust	Volt-ohm meter reading
Frequency coverage	1	145 kHz	fully counter-clockwise	L9	maximum
	2	365 kHz	fully clockwise	CT8	maximum
Tracking	1	160 kHz	tune to 160 kHz	L12	maximum
	2	330 kHz	tune to 330 kHz	CT5	maximum

Note: Repeat above steps two or three times.

Adjustment Location:


CT5
L12
L9
CT8

4. MW and LW Maximum Sensitivity Measurement

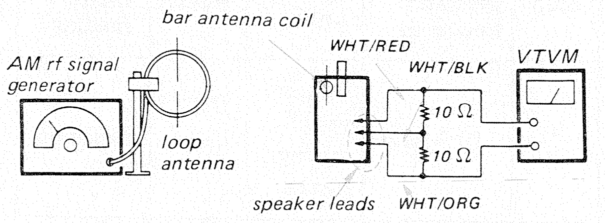
Control/Switch Setting:

RADIO switch: ON
band selector switch: MW or LW
TONE control: HIGH
VOLUME control: MAX
AM rf signal generator:

MW	LW
620 kHz (1400 kHz)	160 kHz (330 kHz)

tuning knob: MW tune to 620 kHz (1,400 kHz)
LW tune to 160 kHz (330 kHz)

Procedure:


bar antenna coil
AM rf signal generator
loop antenna
WHT/RED
WHT/BLK
VTVM
10 Ω
10 Ω
speaker leads
WHT/ORG

1. Adjust AM rf signal generator output for −1 dB (0.69 V) VTVM reading.
2. Modulation Signal (400 Hz) : OFF
   Memorize the VTVM reading.
3. Measure S/N ratio between Step 1 and 2.

S/N Ratio $\geq$ 6 dB

Maximum Sensitivity = AM rf signal generator output level − * attenuation (dB)

S/N Ratio $<$ 6 dB

Increase AM rf signal generator output level so that S/N ratio is 6 dB, keeping VTVM reading −1 dB (0.69 V) by sliding VOLUME control.

Maximum Sensitivity = AM rf signal generator output level − * attenation (dB)

Specification:

MW 33 dB/m (45 µV/m) at S/N 6 dB
LW 41 dB/m (110 µV/m) at S/N 6 dB

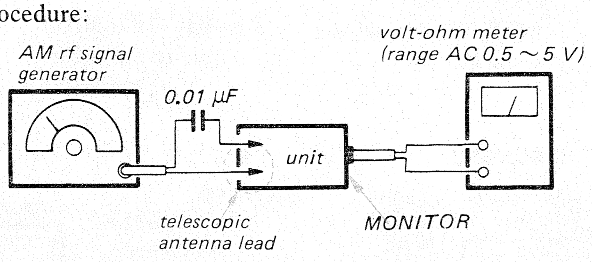
Note: * Attenation is given according to characteristics of loop antenna and distance between bar antenna of radio set and loop antenna.

5. SW Frequency Coverage and Tracking Adjustments

Control/Switch Setting:

RADIO switch: ON
band selector switch: SW
VOLUME control: MAX

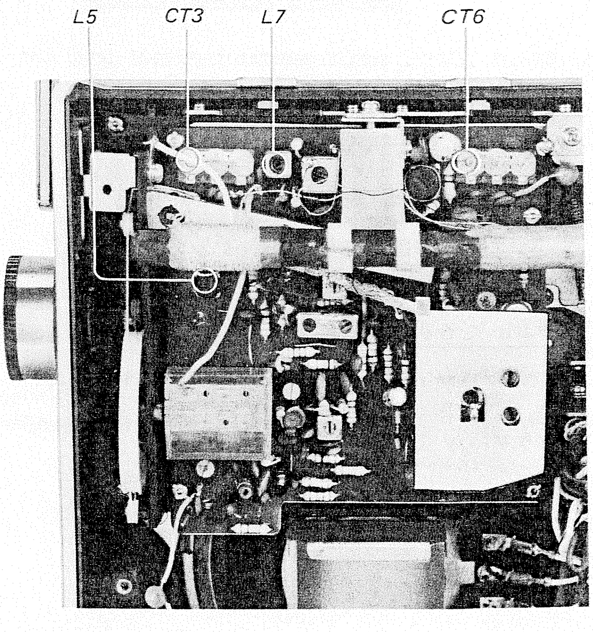
Procedure:


AM rf signal generator
volt-ohm meter (range AC 0.5 ~ 5 V)
0.01 µF
unit
telescopic antenna lead
MONITOR

Adjustment	Step	AM rf signal generator frequency	Tuning knob	Adjust	Volt-ohm meter reading
Frequency coverage	1	5.8 MHz	fully counter-clockwise	L7	maximum
	2	18.4 MHz	fully clockwise	CT6	maximum
Tracking	1	5.8 MHz	fully counter-clockwise	L5	maximum
	2	18.4 MHz	fully clockwise	CT3	maximum

Note: Repeat above steps two or three times.

Adjustment Location:

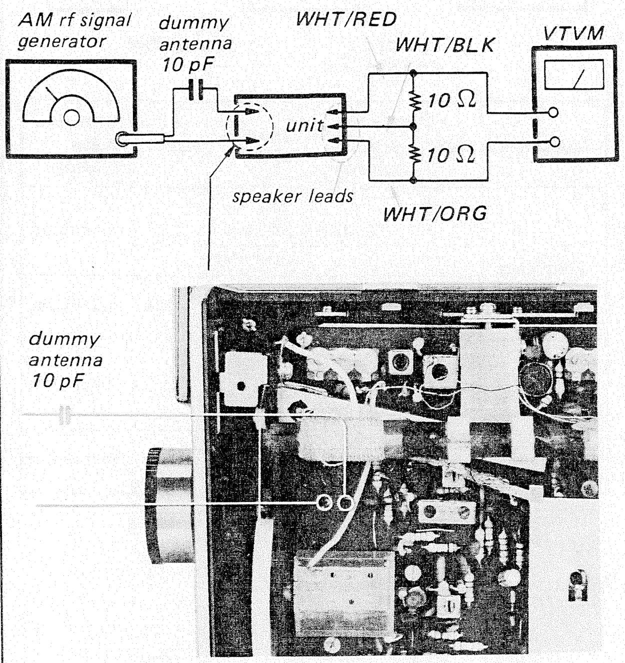

L5
CT3
L7
CT6

6. SW Maximum Sensitivity Measurement

Control/Switch Setting:

RADIO switch: ON
band selector switch: SW
TONE control: HIGH
VOLUME control: MAX
AM rf signal generator frequency: 5.8 MHz (18.4 MHz)
tuning knob: tune to 5.8 MHz (18.4 MHz)

Procedure:


AM rf signal generator
dummy antenna 10 pF
WHT/RED
WHT/BLK
VTVM
unit
10 Ω
10 Ω
speaker leads
WHT/ORG
dummy antenna 10 pF

1. Adjust AM rf signal generator output level for −1 dB (0.69 V) VTVM reading.
2. Modulation signal (400 Hz) : OFF
   Memorize the VTVM reading.
3. Measure S/N ratio between Step 1 and 2.

S/N Ratio $\geq$ 6 dB

Maximum Sensitivity = AM rf signal generator output level

S/N Ratio $<$ 6 dB

Increase AM rf signal generator output level so that S/N ratio is 6 dB, keeping VTVM reading −1 dB (0.69 V) by sliding VOLUME control.

Maximum Sensitivity = AM rf signal generator output level.

Specification:

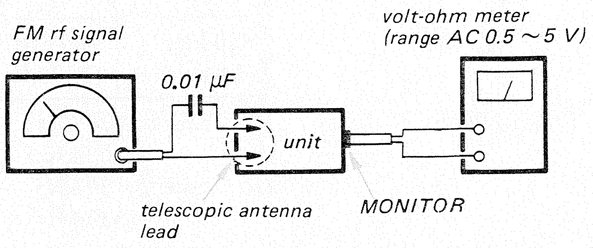
7 dB (2.2 μV) at S/N 6 dB

7. FM I-f Alignment

Control/Switch Setting:

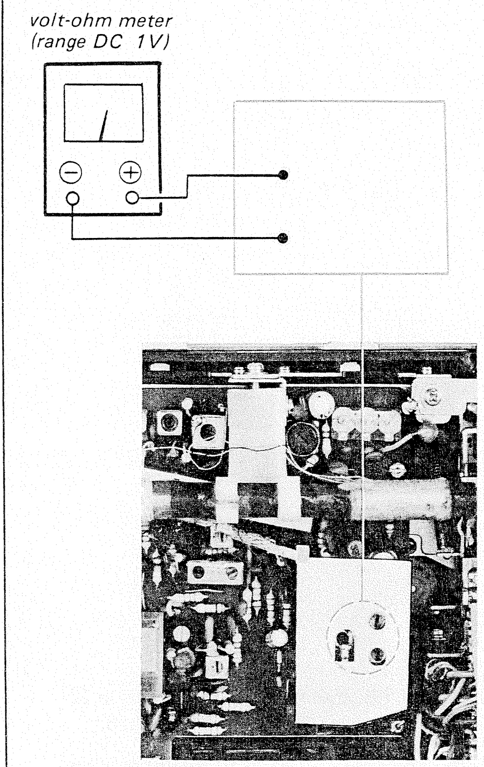
RADIO switch: ON
band selector switch: FM
AFC/ISS switch: OFF
VOLUME control: MAX

Procedure:

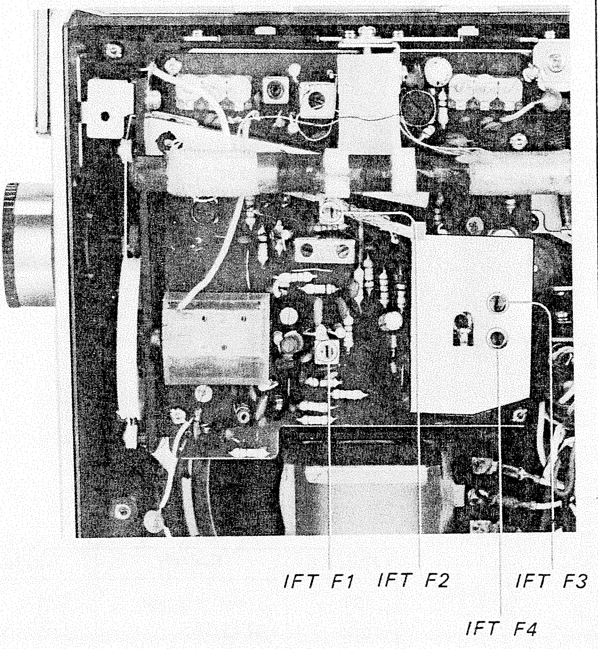

FM rf signal generator
0.01 μF
unit
volt-ohm meter (range AC 0.5 ~ 5 V)
telescopic antenna lead
MONITOR

Step	FM rf signal generator frequency	Tuning knob	Adjust	volt-ohm meter reading
1	10.7 MHz	Detune broadcasting signals.	IFT F1 ~ F4	maximum
2	10.7 MHz	Detune broadcasting signals.	FM rf signal generator tuning knob	maximum
3	Repeat above steps two or three times.			
4	no signal	Detune broadcasting signals.	IFT F4	DC 0 V (See Figure on Page 29.)

– continued on next page –


volt-ohm meter
(range DC 1V)

Adjustment Location:

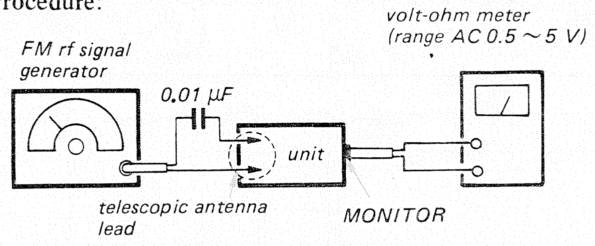

IFT F1
IFT F2
IFT F3
IFT F4

8. FM Frequency Coverage and Tracking Adjustments

Control/Switch Setting:

RADIO switch:	ON
band selector switch:	FM
AFC/ISS switch:	OFF
VOLUME control:	MAX

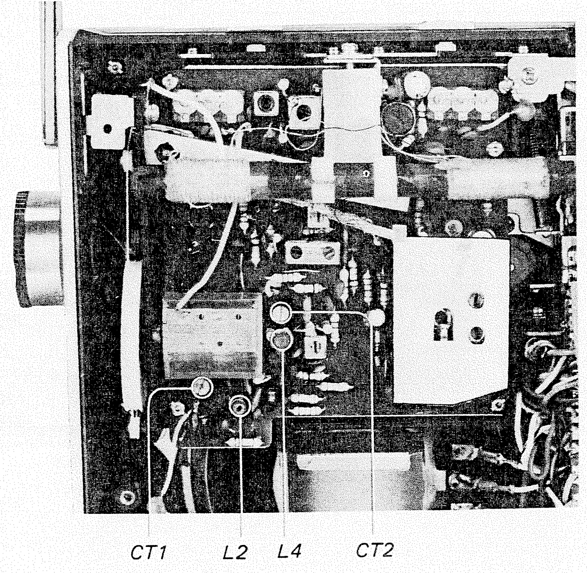
Procedure:


FM rf signal generator
0.01 μF
unit
volt-ohm meter
(range AC 0.5 ~ 5 V)
telescopic antenna lead
MONITOR

Adjustment	Step	FM rf signal generator frequency	Tuning knob	Adjust	volt-ohm meter reading
Frequency coverage	1	87.1 MHz	fully counter-clockwise	L4	maximum
	2	108.5 MHz	fully clockwise	CT2	maximum
Tracking	1	87.1 MHz	fully counter-clockwise	L2	maximum
	2	108.5 MHz	fully clockwise	CT1	maximum

Note: Repeat above steps two or three times.

Adjustment Location:

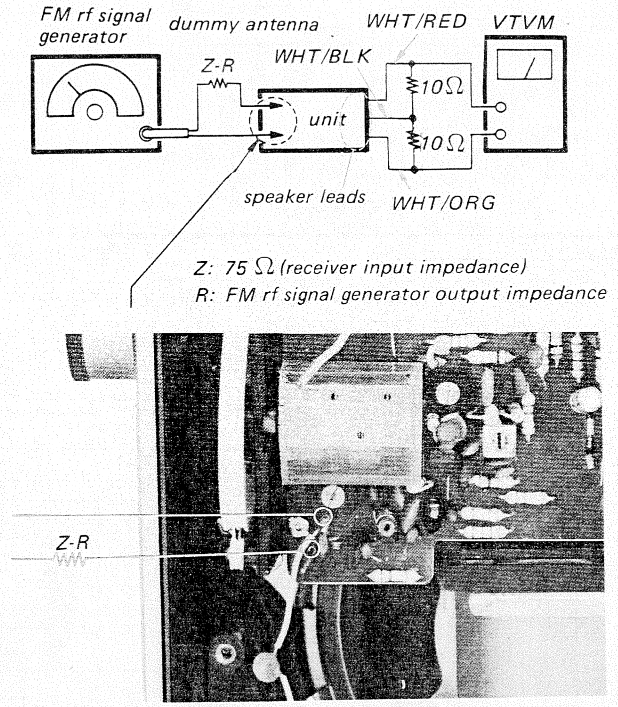

CT1
L2
L4
CT2

9. FM Usable Sensitivity Measurement

Control/Switch Setting:

RADIO switch:	ON
band selector switch:	FM
AFC/ISS switch:	OFF
TONE control:	mechanical mid
VOLUME control:	mechanical mid
FM rf signal generator output level:	15 dB (5.6 μV)
FM rf signal generator frequency:	87.1 MHz (108.5 MHz)
tuning knob:	tune to 87.1 MHz (108.5 MHz)

Procedure:


FM rf signal generator
dummy antenna
Z-R
WHT/RED
WHT/BLK
VTVM
unit
10Ω
10Ω
speaker leads
WHT/ORG
Z: 75 Ω (receiver input impedance)
R: FM rf signal generator output impedance
Z-R

2. Adjust VOLUME control for –1 dB (0.69 V) VTVM reading.
3. Modulation signal (400 Hz) : OFF Memorize the VTVM reading.
4. Measure S/N ratio between step 2 and 3.
5. Repeating above steps, adjust FM rf signal generator output level so that S/N ratio becomes 30 dB.
6. Read output level of the signal generator.

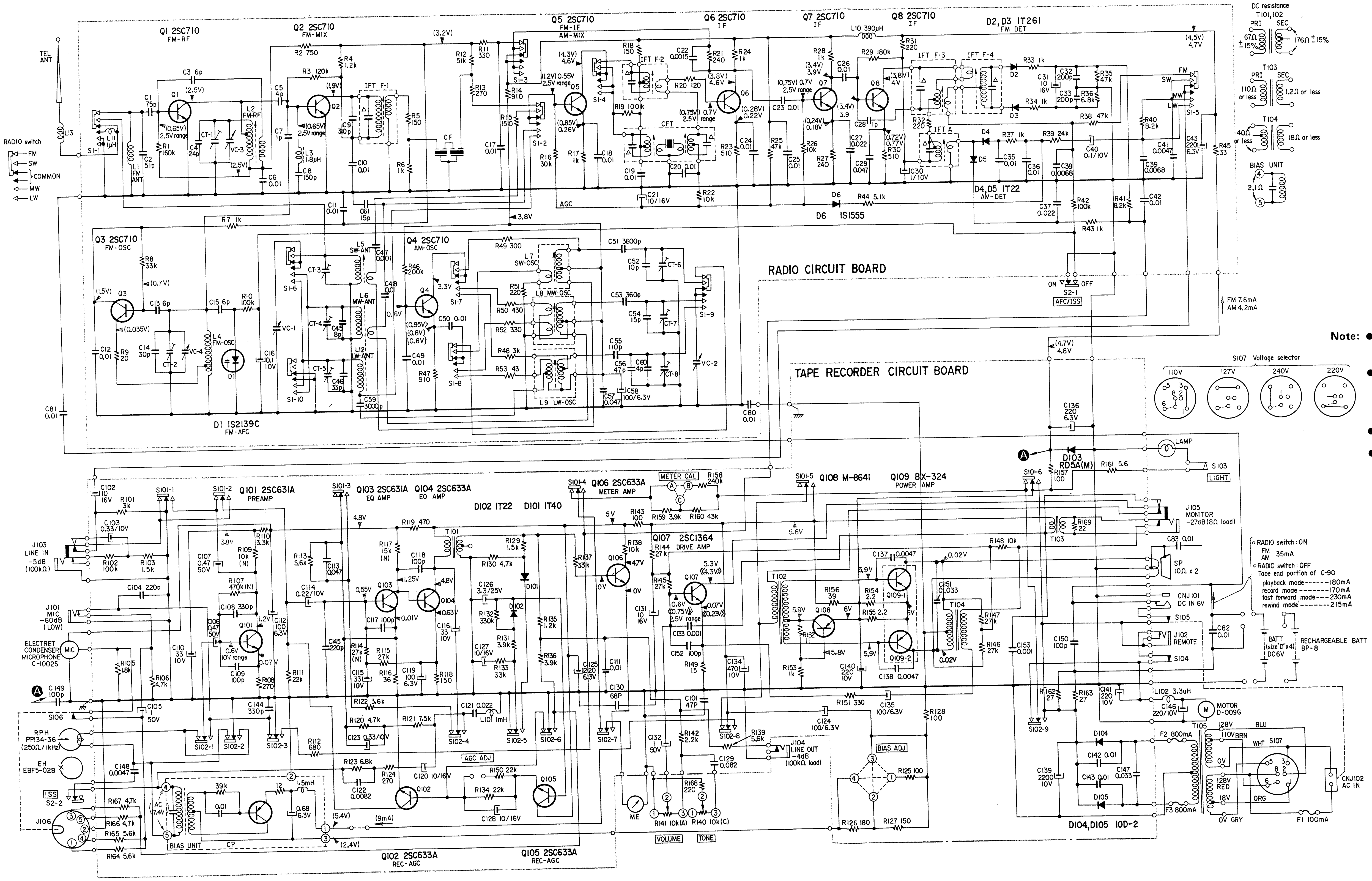
Specification:

13 dB (4.5 μV) at S/N 30 dB

SECTION 4

DIAGRAMS

4-1. SCHEMATIC DIAGRAM


TEL ANT
RADIO switch
FM
SW
COMMON
MW
LW
Q1 2SC710 FM-RF
Q2 2SC710 FM-MIX
Q3 2SC710 FM-OSC
Q4 2SC710 AM-OSC
Q5 2SC710 FM-IF AM-MIX
Q6 2SC710 IF
Q7 2SC710 IF
Q8 2SC710 IF
D2, D3 IT261 FM DET
D4, D5 IT22 AM-DET
D6 IS1555
D1 IS2139C FM-AFC
IFT F-1
IFT F-2
IFT F-3
IFT F-4
IFT A
CFT
CF
AGC
L5 SW-ANT
L6 MW-ANT
L12 LW-ANT
L7 SW-OSC
L8 MW-OSC
L9 LW-OSC
L4 FM-OSC
L2 FM-RF
RADIO CIRCUIT BOARD
S2-1 AFC/ISS
ON OFF
FM 7.6mA
AM 4.2mA
DC resistance T101, 102
PRI SEC
67Ω ±15%
176Ω ±15%
T103
110Ω or less
1.2Ω or less
T104
40Ω or less
18Ω or less
BIAS UNIT
2.1Ω
S107 Voltage selector
110V
127V
240V
220V
TAPE RECORDER CIRCUIT BOARD
Q101 2SC631A PREAMP
Q103 2SC631A EQ AMP
Q104 2SC633A EQ AMP
D102 IT22
D101 IT40
Q106 2SC633A METER AMP
METER CAL
Q107 2SC1364 DRIVE AMP
Q108 M-8641
Q109 BX-324 POWER AMP
D103 RD5A(M)
LAMP
S103
LIGHT
J105 MONITOR -27dB(8Ω load)
SP 10Ω x 2
RADIO switch: ON
FM 35mA
AM
RADIO switch: OFF
Tape end portion of C-90
playback mode ------ 180mA
record mode ------- 170mA
fast forward mode --- 230mA
rewind mode -------- 215mA
CNJ101 DC IN 6V
S105
J102 REMOTE
S104
BATT (size"D"x4) DC6V
RECHARGEABLE BATT BP-8
J103 LINE IN -5dB (100kΩ)
J101 MIC -60dB (LOW)
ELECTRET CONDENSER MICROPHONE C-1002S
RPH PP134-36 (250Ω/1kHz)
EH EBF5-028
ISS S2-2
J106
BIAS UNIT
CP
Q102 2SC633A REC-AGC
Q105 2SC633A REC-AGC
AGC ADJ
BIAS ADJ
ME
VOLUME
TONE
R141 10k(A)
R140 10k(C)
J104 LINE OUT -4dB (100kΩ load)
MOTOR D-009G
T105
F2 800mA
F3 800mA
D104, D105 10D-2
CNJ102 AC IN
F1 100mA
T101
T102
T103
T104

Note:

- All resistors and capacitors are in Ω and μF, unless otherwise specified.
- Letter in ( ) suffixed to variable resistor value indicates characteristics.
- (N): Low noise resistor
- Voltage values shown are measured with a voltmeter (20 kΩ/V). Variations may be noted due to normal production tolerances.

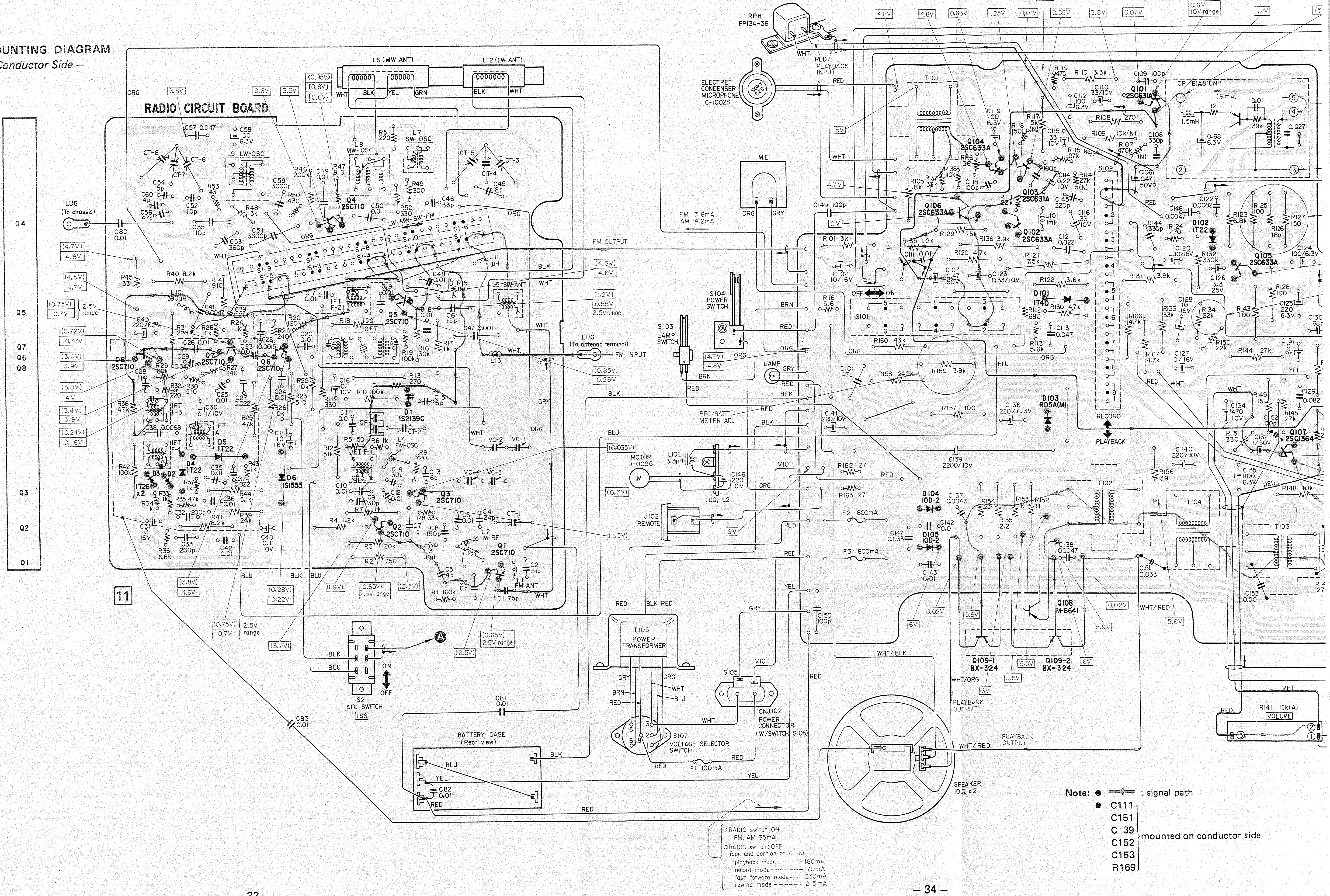
  tape recorder section
  no mark: playback mode
  ( ): record mode
  ≪ ≫: With plug installed MONITOR jack

  radio section (detuned)
  ( ): FM mode
  [ ]: MW mode
  { }: LW mode
  < >: SW mode
  no mark: FM, MW, LW and SW mode
- Capacitors marked △ are included in i-f transformers.
- Switch mode:

Ref. No.	Switch	Mode
S1	band selector	FM
S2	AFC/ISS	OFF
S101	RADIO	OFF
S102	record/playback	playback
S103	lamp	OFF
S104	power	ON
S105	ac/dc	dc
S106	mic	ON
S107	voltage selector	

4-2. MOUNTING DIAGRAM

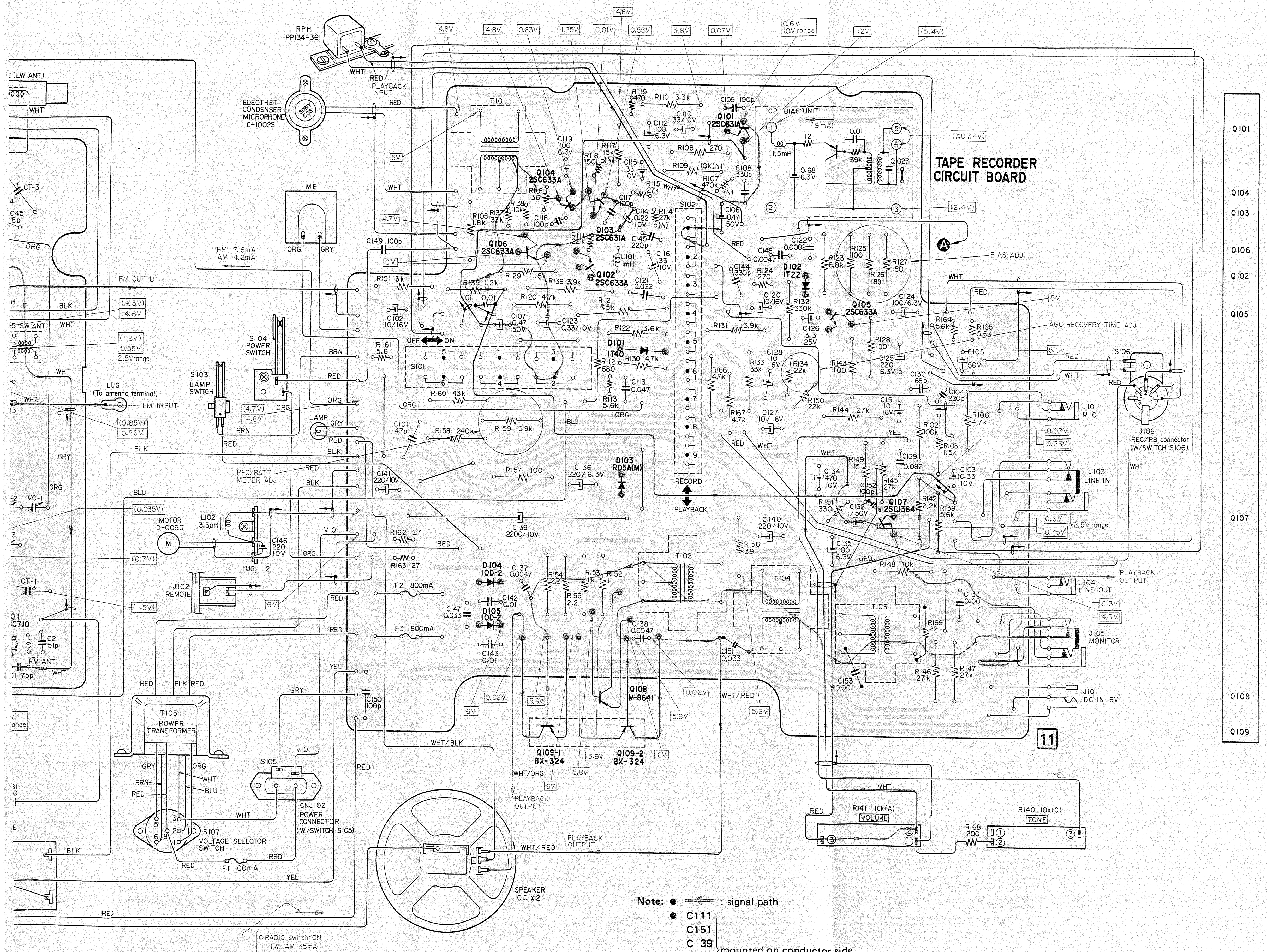
– Conductor Side –


RADIO CIRCUIT BOARD
11
Q4
Q5
Q7
Q6
Q8
Q3
Q2
Q1
L6 (MW ANT)
L12 (LW ANT)
WHT
BLK
YEL
GRN
L9 LW-OSC
L8 MW-OSC
L7 SW-OSC
CT-8
CT-7
CT-6
CT-5
CT-4
CT-3
LW-MW-SW-FM
S1-1
S1-2
S1-3
S1-4
S1-5
S1-6
S1-7
S1-8
S1-9
S1-10
LUG (To chassis)
LUG (To antenna terminal)
FM INPUT
FM OUTPUT
FM ANT
L1
L2 FM-RF
L3 1.8μH
L4 FM-OSC
L5 SW-ANT
L10 390μH
L11 1μH
L13
IFT F-1
IFT F-2
IFT F-3
IFT F-4
IFT A
CFT
CF
VC-1
VC-2
VC-3
VC-4
CT-1
CT-2
Q1 2SC710
Q2 2SC710
Q3 2SC710
Q4 2SC710
Q5 2SC710
Q6 2SC710
Q7 2SC710
Q8 2SC710
D1 1S2139C
D2
D3
D4 1T22
D5 1T22
D6 1S1555
IT26 x2
S2 AFC SWITCH
ON
OFF
1SS
A
(3.8V)
(0.6V)
(3.3V)
(0.95V)
(0.8V)
(0.6V)
(4.7V) 4.8V
(4.5V) 4.7V
(0.75V) 0.7V 2.5V range
(0.72V) 0.77V
(3.4V) 3.9V
(3.8V) 4V
(0.24V) 0.18V
(4.3V) 4.6V
(1.2V) 0.55V 2.5Vrange
(0.85V) 0.26V
(0.035V)
(0.7V)
(1.5V)
(3.8V) 4.6V
(0.28V) 0.22V
(1.9V)
(0.65V) 2.5V range
(2.5V)
(3.2V)
RPH PP134-36
PLAYBACK INPUT
ELECTRET CONDENSER MICROPHONE C-1002S
SONY C25
ME
FM 7.6mA
AM 4.2mA
T101
T102
T103
T104
T105 POWER TRANSFORMER
Q101 2SC631A
Q102 2SC633A
Q103 2SC631A
Q104 2SC633A
Q105 2SC633A
Q106 2SC633A
Q107 2SC1364
Q108 M-8641
Q109-1 BX-324
Q109-2 BX-324
D101 1T40
D102 1T22
D103 RD5A(M)
D104 10D-2
D105 10D-2
CP BIAS UNIT
(9mA)
S101
S102
RECORD
PLAYBACK
S103 LAMP SWITCH
S104 POWER SWITCH
S105
S107 VOLTAGE SELECTOR SWITCH
OFF
ON
LAMP
LUG, IL2
MOTOR D-009G
PEC/BATT METER ADJ
J102 REMOTE
F1 100mA
F2 800mA
F3 800mA
CNJ102 POWER CONNECTOR (W/SWITCH S105)
BATTERY CASE (Rear view)
SPEAKER 10Ω x2
PLAYBACK OUTPUT
R141 10k(A) VOLUME
4.8V
4.8V
0.63V
1.25V
0.01V
0.55V
3.8V
0.07V
0.6V 10V range
1.2V
5V
4.7V
0V
4.7V
4.8V
6V
0.02V
5.9V
5.8V
5.9V
6V
0.02V
5.9V
5.6V
6V
RED
BLK
WHT
ORG
GRY
BRN
BLU
YEL
WHT/BLK
WHT/ORG
WHT/RED
V10

- RADIO switch: ON
  FM, AM 35mA
- RADIO switch: OFF
  Tape end portion of C-90
  playback mode--------180mA
  record mode---------170mA
  fast forward mode---230mA
  rewind mode--------215mA

Note: ● ⟸ : signal path

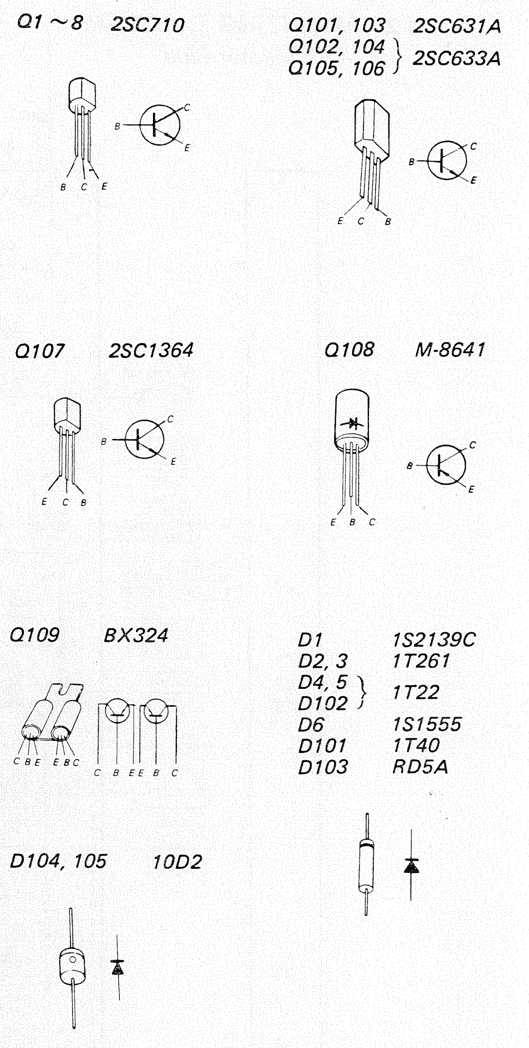
● C111
C151
C 39
C152
C153
R169 } mounted on conductor side


TAPE RECORDER CIRCUIT BOARD
11
RPH PP134-36
ELECTRET CONDENSER MICROPHONE C-1002S
PLAYBACK INPUT
ME
FM 7.6mA
AM 4.2mA
FM OUTPUT
FM INPUT
LUG (To antenna terminal)
S104 POWER SWITCH
S103 LAMP SWITCH
LAMP
PEC/BATT METER ADJ
MOTOR D-009G
L102 3.3μH
C146 220 10V
LUG, IL2
J102 REMOTE
T105 POWER TRANSFORMER
S105
CNJ102 POWER CONNECTOR (W/SWITCH S105)
S107 VOLTAGE SELECTOR SWITCH
F1 100mA
F2 800mA
F3 800mA
SPEAKER 10Ω x 2
PLAYBACK OUTPUT
T101
T102
T103
T104
CP. BIAS UNIT
(AC 7.4V)
(2.4V)
BIAS ADJ
AGC RECOVERY TIME ADJ
S101
OFF ON
S102
RECORD
PLAYBACK
Q101 2SC631A
Q102 2SC633A
Q103 2SC631A
Q104 2SC633A
Q105 2SC633A
Q106 2SC633A
Q107 2SC1364
Q108 M-8641
Q109-1 BX-324
Q109-2 BX-324
D101 1T40
D102 1T22
D103 RD5A(M)
D104 10D-2
D105 10D-2
S106
J106 REC/PB connector (W/SWITCH S106)
J101 MIC
J103 LINE IN
J104 LINE OUT
J105 MONITOR
J101 DC IN 6V
R141 10k(A) VOLUME
R140 10k(C) TONE
R168 200
4.8V
0.63V
1.25V
0.01V
0.55V
3.8V
0.07V
0.6V 10V range
1.2V
(5.4V)
5V
4.7V
0V
2.5V range
5.9V
5.8V
6V
0.02V
5.6V
5.3V
4.3V
WHT
RED
BLK
ORG
GRY
BRN
BLU
YEL
WHT/BLK
WHT/RED
WHT/ORG
Q101
Q104
Q103
Q106
Q102
Q105
Q107
Q108
Q109

○RADIO switch: ON
FM, AM 35mA
○RADIO switch: OFF
Tape end portion of C-90
playback mode ------ 180mA
record mode ------ 170mA
fast forward mode --- 230mA
rewind mode ------ 215mA

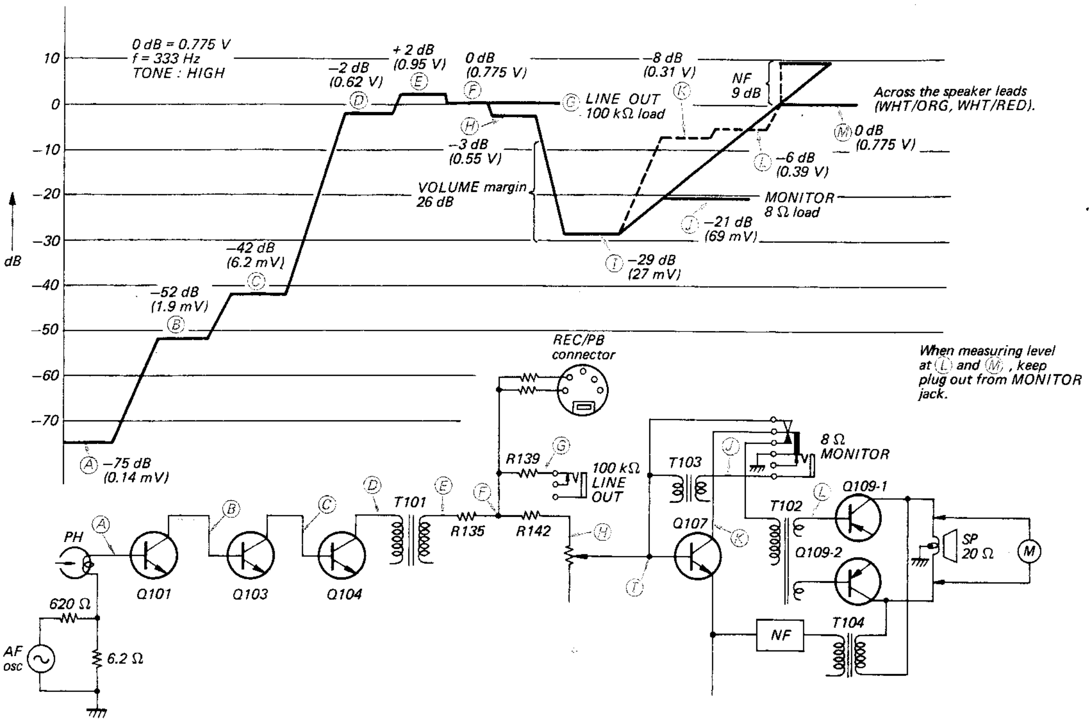
Note: ● ⟸ : signal path

● C111
C151
C 39
C152
C153
R169
} mounted on conductor side

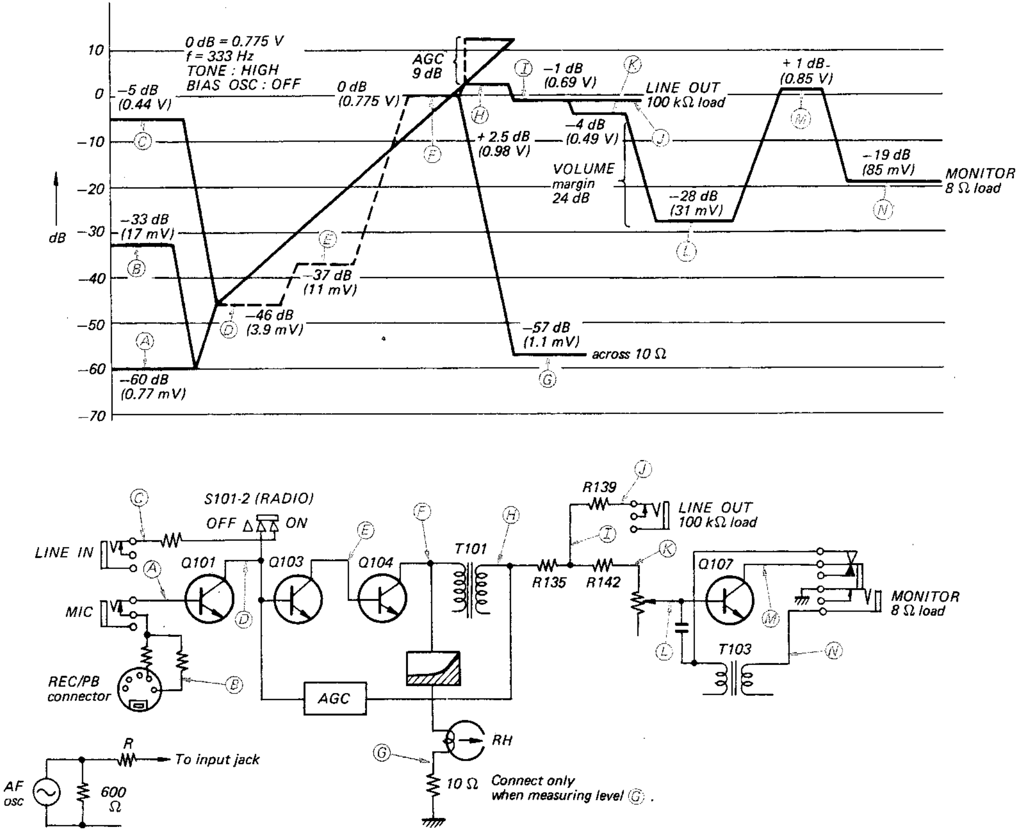

Q1 ~ 8 2SC710
Q101, 103 2SC631A
Q102, 104
Q105, 106 } 2SC633A
Q107 2SC1364
Q108 M-8641
Q109 BX324
D1 1S2139C
D2, 3 1T261
D4, 5
D102 } 1T22
D6 1S1555
D101 1T40
D103 RD5A
D104, 105 10D2
B C E
E C B
E B C
C B E E B C
C B E E B C

4-3. LEVEL DIAGRAMS

Playback


0 dB = 0.775 V
f = 333 Hz
TONE : HIGH
10
0
–10
–20
–30
–40
–50
–60
–70
dB
Ⓐ –75 dB (0.14 mV)
–52 dB (1.9 mV) Ⓑ
–42 dB (6.2 mV) Ⓒ
–2 dB (0.62 V) Ⓓ
+2 dB (0.95 V) Ⓔ
0 dB (0.775 V) Ⓕ
Ⓖ LINE OUT 100 kΩ load
Ⓗ –3 dB (0.55 V)
VOLUME margin 26 dB
Ⓘ –29 dB (27 mV)
Ⓙ –21 dB (69 mV)
–8 dB (0.31 V) Ⓚ
NF 9 dB
Ⓛ –6 dB (0.39 V)
Ⓜ 0 dB (0.775 V)
MONITOR 8 Ω load
Across the speaker leads (WHT/ORG, WHT/RED).
When measuring level at Ⓛ and Ⓜ, keep plug out from MONITOR jack.
REC/PB connector
R139
100 kΩ LINE OUT
8 Ω MONITOR
T101
T103
T102
R135
R142
PH
Q101
Q103
Q104
Q107
Q109-1
Q109-2
SP 20 Ω
M
NF
T104
620 Ω
6.2 Ω
AF osc

Record

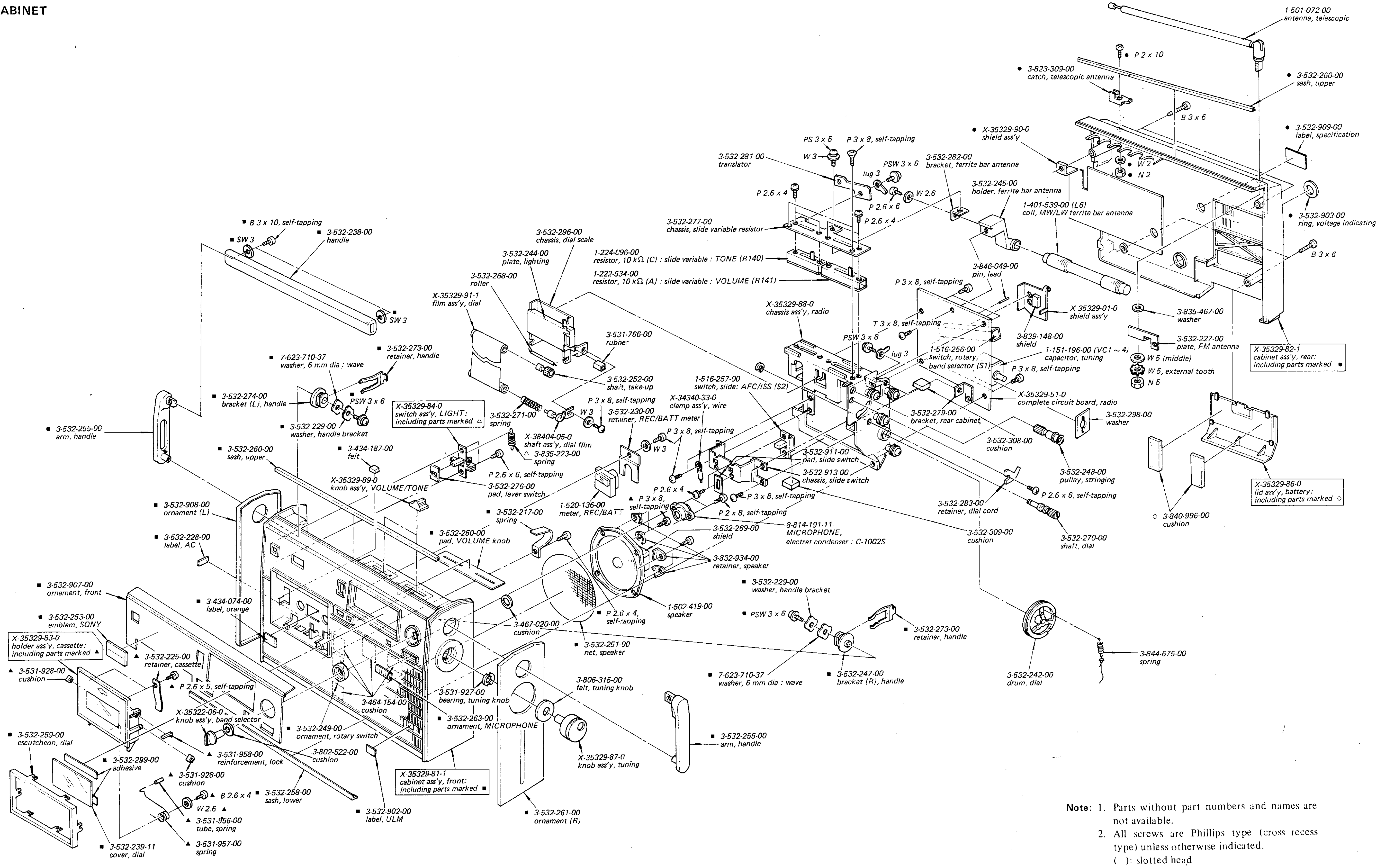

0 dB = 0.775 V
f = 333 Hz
TONE : HIGH
BIAS OSC : OFF
10
0
–10
–20
–30
–40
–50
–60
–70
dB
–5 dB (0.44 V) Ⓒ
–33 dB (17 mV) Ⓑ
Ⓐ –60 dB (0.77 mV)
Ⓓ –46 dB (3.9 mV)
Ⓔ –37 dB (11 mV)
0 dB (0.775 V) Ⓕ
AGC 9 dB
Ⓗ +2.5 dB (0.98 V)
Ⓘ –1 dB (0.69 V)
Ⓚ LINE OUT 100 kΩ load
–4 dB (0.49 V) Ⓙ
VOLUME margin 24 dB
–28 dB (31 mV) Ⓛ
+1 dB (0.85 V) Ⓜ
–19 dB (85 mV) Ⓝ
MONITOR 8 Ω load
–57 dB (1.1 mV) across 10 Ω Ⓖ
S101-2 (RADIO)
OFF ON
LINE IN
MIC
REC/PB connector
Q101
Q103
Q104
T101
AGC
RH
10 Ω
Connect only when measuring level Ⓖ.
R139
LINE OUT 100 kΩ load
R135
R142
Q107
T103
MONITOR 8 Ω load
AF osc
600 Ω
R
To input jack

R { MIC . . . . 300 Ω
LINE IN . . . . 10 kΩ (RADIO switch: ON)
REC/PB connector . . 80 kΩ }

SECTION 5

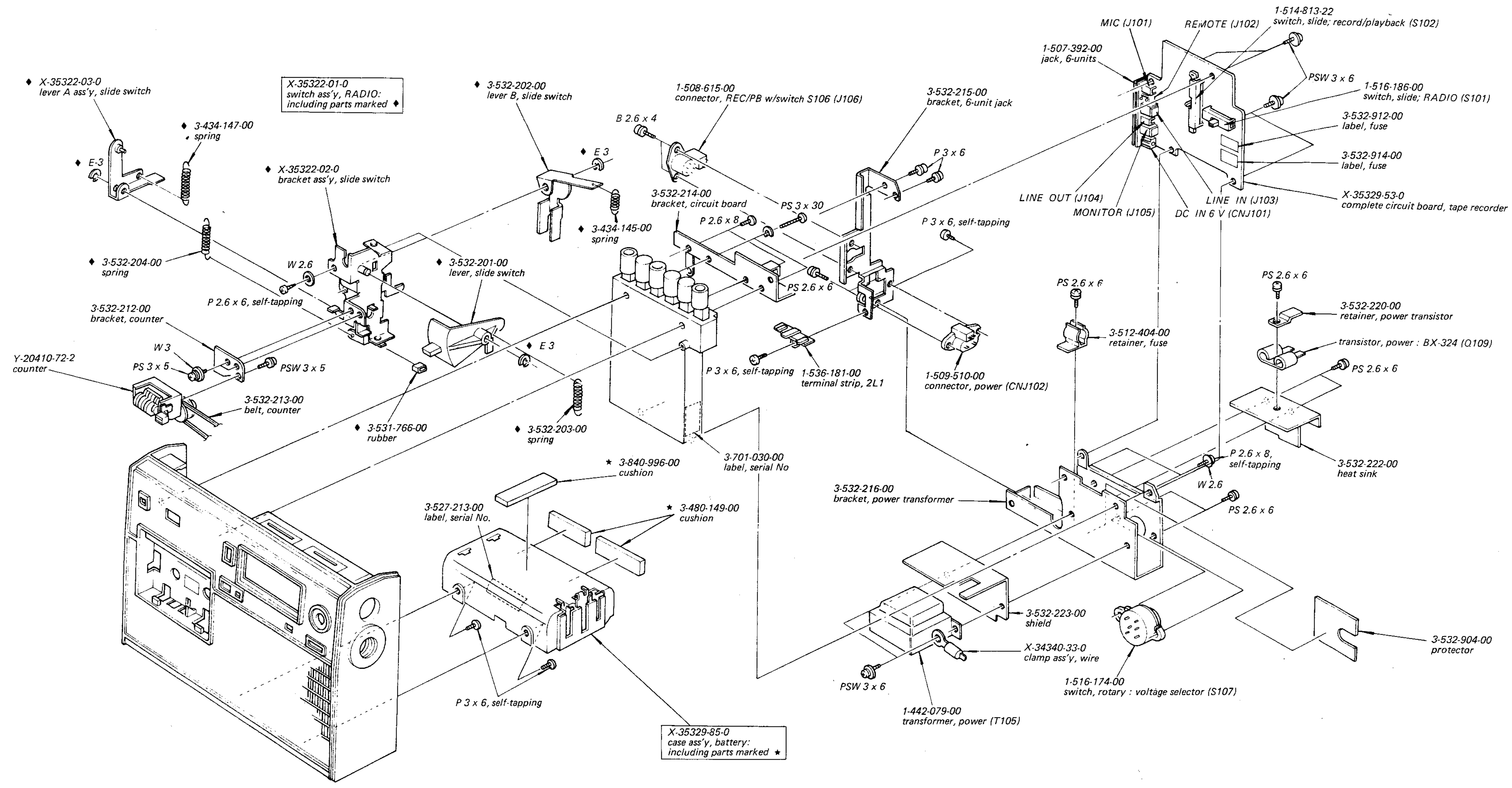
EXPLODED VIEWS

5-1. CABINET


1-501-072-00
antenna, telescopic
• P 2 x 10
• 3-823-309-00
catch, telescopic antenna
• 3-532-260-00
sash, upper
B 3 x 6
• X-35329-90-0
shield ass'y
• 3-532-909-00
label, specification
W 2
N 2
• 3-532-903-00
ring, voltage indicating
B 3 x 6
PS 3 x 5
P 3 x 8, self-tapping
W 3
3-532-281-00
translator
PSW 3 x 6
lug 3
3-532-282-00
bracket, ferrite bar antenna
3-532-245-00
holder, ferrite bar antenna
P 2.6 x 4
P 2.6 x 6
W 2.6
P 2.6 x 4
1-401-539-00 (L6)
coil, MW/LW ferrite bar antenna
3-532-277-00
chassis, slide variable resistor
■ B 3 x 10, self-tapping
■ SW 3
■ 3-532-238-00
handle
3-532-296-00
chassis, dial scale
3-532-244-00
plate, lighting
1-224-096-00
resistor, 10 kΩ (C) : slide variable : TONE (R140)
1-222-534-00
resistor, 10 kΩ (A) : slide variable : VOLUME (R141)
3-846-049-00
pin, lead
3-532-268-00
roller
P 3 x 8, self-tapping
X-35329-91-1
film ass'y, dial
X-35329-88-0
chassis ass'y, radio
X-35329-01-0
shield ass'y
3-835-467-00
washer
■ SW 3
T 3 x 8, self-tapping
3-531-766-00
rubber
PSW 3 x 8
3-839-148-00
shield
3-532-227-00
plate, FM antenna
lug 3
1-516-256-00
switch, rotary;
band selector (S1)
1-151-196-00 (VC1 ~ 4)
capacitor, tuning
W 5 (middle)
W 5, external tooth
N 5
X-35329-82-1
cabinet ass'y, rear:
including parts marked •
■ 7-623-710-37
washer, 6 mm dia : wave
■ 3-532-273-00
retainer, handle
P 3 x 8, self-tapping
3-532-252-00
shaft, take-up
1-516-257-00
switch, slide: AFC/ISS (S2)
X-35329-51-0
complete circuit board, radio
■ 3-532-274-00
bracket (L), handle
■ PSW 3 x 6
X-35329-84-0
switch ass'y, LIGHT:
including parts marked △
3-532-271-00
spring
P 3 x 8, self-tapping
W 3
X-34340-33-0
clamp ass'y, wire
3-532-230-00
retainer, REC/BATT meter
3-532-279-00
bracket, rear cabinet
3-532-298-00
washer
■ 3-532-255-00
arm, handle
■ 3-532-229-00
washer, handle bracket
X-38404-05-0
shaft ass'y, dial film
△ 3-835-223-00
spring
P 3 x 8, self-tapping
W 3
3-532-308-00
cushion
■ 3-532-260-00
sash, upper
■ 3-434-187-00
felt
P 2.6 x 6, self-tapping
3-532-911-00
pad, slide switch
3-532-913-00
chassis, slide switch
3-532-248-00
pulley, stringing
X-35329-89-0
knob ass'y, VOLUME/TONE
3-532-276-00
pad, lever switch
P 2.6 x 4
▲ P 3 x 8,
self-tapping
P 3 x 8, self-tapping
3-532-283-00
retainer, dial cord
P 2.6 x 6, self-tapping
X-35329-86-0
lid ass'y, battery:
including parts marked ◇
■ 3-532-908-00
ornament (L)
■ 3-532-217-00
spring
1-520-136-00
meter, REC/BATT
P 2 x 8, self-tapping
8-814-191-11
MICROPHONE,
electret condenser : C-1002S
◇ 3-840-996-00
cushion
■ 3-532-228-00
label, AC
■ 3-532-250-00
pad, VOLUME knob
3-532-269-00
shield
3-532-309-00
cushion
3-532-270-00
shaft, dial
3-832-934-00
retainer, speaker
■ 3-532-907-00
ornament, front
■ 3-434-074-00
label, orange
■ 3-532-229-00
washer, handle bracket
■ 3-532-253-00
emblem, SONY
■ P 2.6 x 4,
self-tapping
1-502-419-00
speaker
■ PSW 3 x 6
X-35329-83-0
holder ass'y, cassette:
including parts marked ▲
▲ 3-532-225-00
retainer, cassette
3-467-020-00
cushion
■ 3-532-273-00
retainer, handle
■ 3-532-251-00
net, speaker
3-844-675-00
spring
▲ 3-531-928-00
cushion
▲ P 2.6 x 5, self-tapping
■ 7-623-710-37
washer, 6 mm dia : wave
■ 3-532-247-00
bracket (R), handle
3-532-242-00
drum, dial
3-806-315-00
felt, tuning knob
3-531-927-00
bearing, tuning knob
X-35322-06-0
knob ass'y, band selector
3-464-154-00
cushion
■ 3-532-263-00
ornament, MICROPHONE
■ 3-532-259-00
escutcheon, dial
■ 3-532-249-00
ornament, rotary switch
■ 3-532-255-00
arm, handle
▲ 3-531-958-00
reinforcement, lock
3-802-522-00
cushion
■ 3-532-299-00
adhesive
X-35329-87-0
knob ass'y, tuning
▲ 3-531-928-00
cushion
X-35329-81-1
cabinet ass'y, front:
including parts marked ■
▲ B 2.6 x 4
■ 3-532-258-00
sash, lower
W 2.6 ▲
■ 3-532-902-00
label, ULM
■ 3-532-261-00
ornament (R)
▲ 3-531-956-00
tube, spring
■ 3-532-239-11
cover, dial
▲ 3-531-957-00
spring

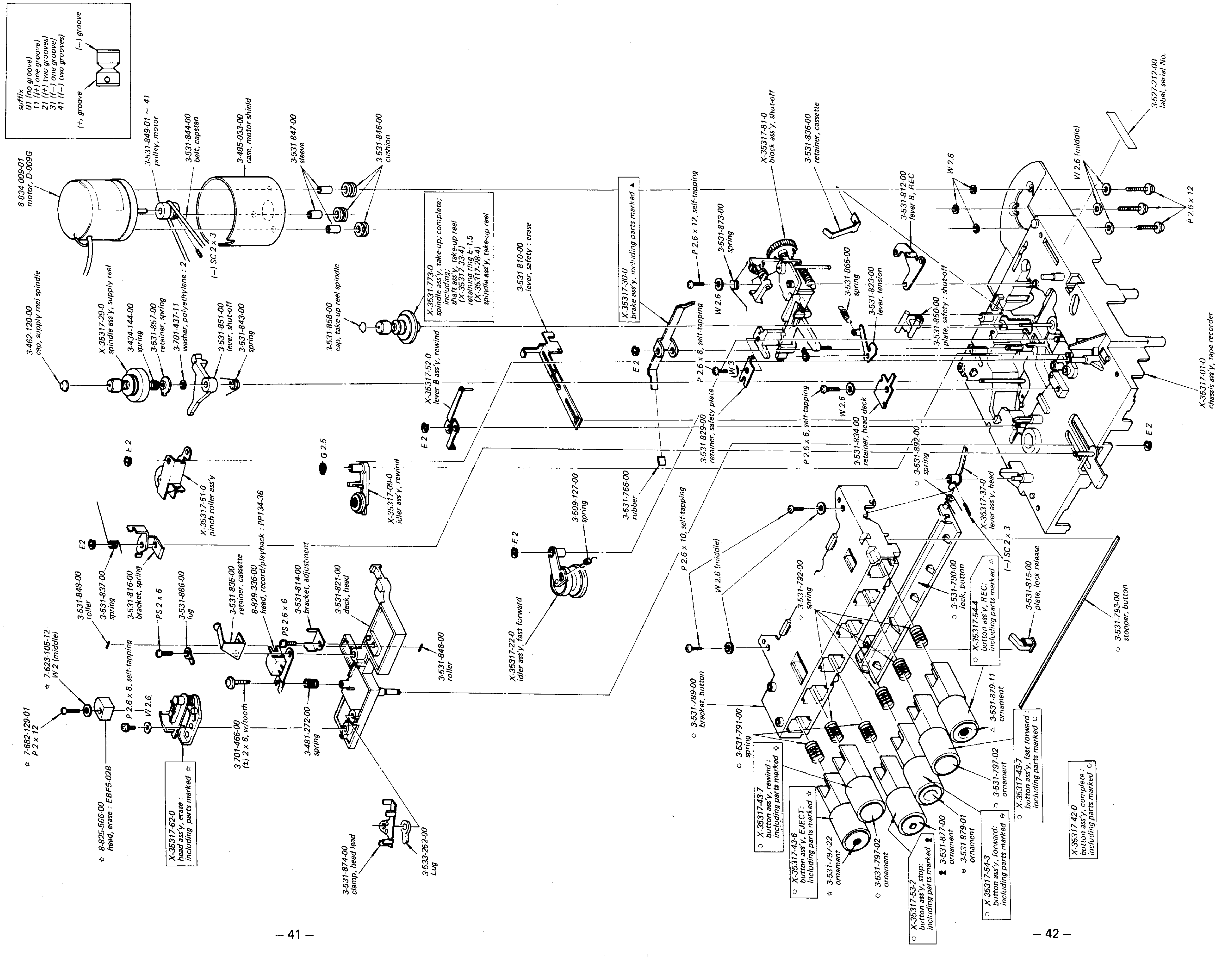
Note: 1. Parts without part numbers and names are not available.
2. All screws are Phillips type (cross recess type) unless otherwise indicated.
(−): slotted head

5-2. RADIO SECTION


♦ X-35322-03-0
lever A ass'y, slide switch
X-35322-01-0
switch ass'y, RADIO:
including parts marked ♦
♦ 3-532-202-00
lever B, slide switch
1-508-615-00
connector, REC/PB w/switch S106 (J106)
3-532-215-00
bracket, 6-unit jack
MIC (J101)
REMOTE (J102)
1-514-813-22
switch, slide; record/playback (S102)
1-507-392-00
jack, 6-units
PSW 3 x 6
1-516-186-00
switch, slide; RADIO (S101)
3-532-912-00
label, fuse
3-532-914-00
label, fuse
X-35329-53-0
complete circuit board, tape recorder
LINE OUT (J104)
MONITOR (J105)
DC IN 6 V (CNJ101)
LINE IN (J103)
♦ 3-434-147-00
♦ spring
♦ E-3
♦ X-35322-02-0
bracket ass'y, slide switch
B 2.6 x 4
♦ E 3
♦ 3-434-145-00
spring
3-532-214-00
bracket, circuit board
P 2.6 x 8
PS 3 x 30
P 3 x 6
P 3 x 6, self-tapping
♦ 3-532-204-00
spring
W 2.6
♦ 3-532-201-00
lever, slide switch
PS 2.6 x 6
3-532-212-00
bracket, counter
P 2.6 x 6, self-tapping
PS 2.6 x 6
3-532-220-00
retainer, power transistor
3-512-404-00
retainer, fuse
transistor, power : BX-324 (Q109)
PS 2.6 x 6
W 3
PS 3 x 5
PSW 3 x 5
♦ E 3
Y-20410-72-2
counter
3-532-213-00
belt, counter
P 3 x 6, self-tapping
1-536-181-00
terminal strip, 2L1
1-509-510-00
connector, power (CNJ102)
♦ 3-531-766-00
rubber
♦ 3-532-203-00
spring
3-701-030-00
label, serial No
P 2.6 x 8,
self-tapping
3-532-222-00
heat sink
★ 3-840-996-00
cushion
W 2.6
PS 2.6 x 6
3-527-213-00
label, serial No.
★ 3-480-149-00
cushion
3-532-216-00
bracket, power transformer
3-532-223-00
shield
X-34340-33-0
clamp ass'y, wire
3-532-904-00
protector
PSW 3 x 6
1-516-174-00
switch, rotary : voltage selector (S107)
P 3 x 6, self-tapping
1-442-079-00
transformer, power (T105)
X-35329-85-0
case ass'y, battery:
including parts marked ★

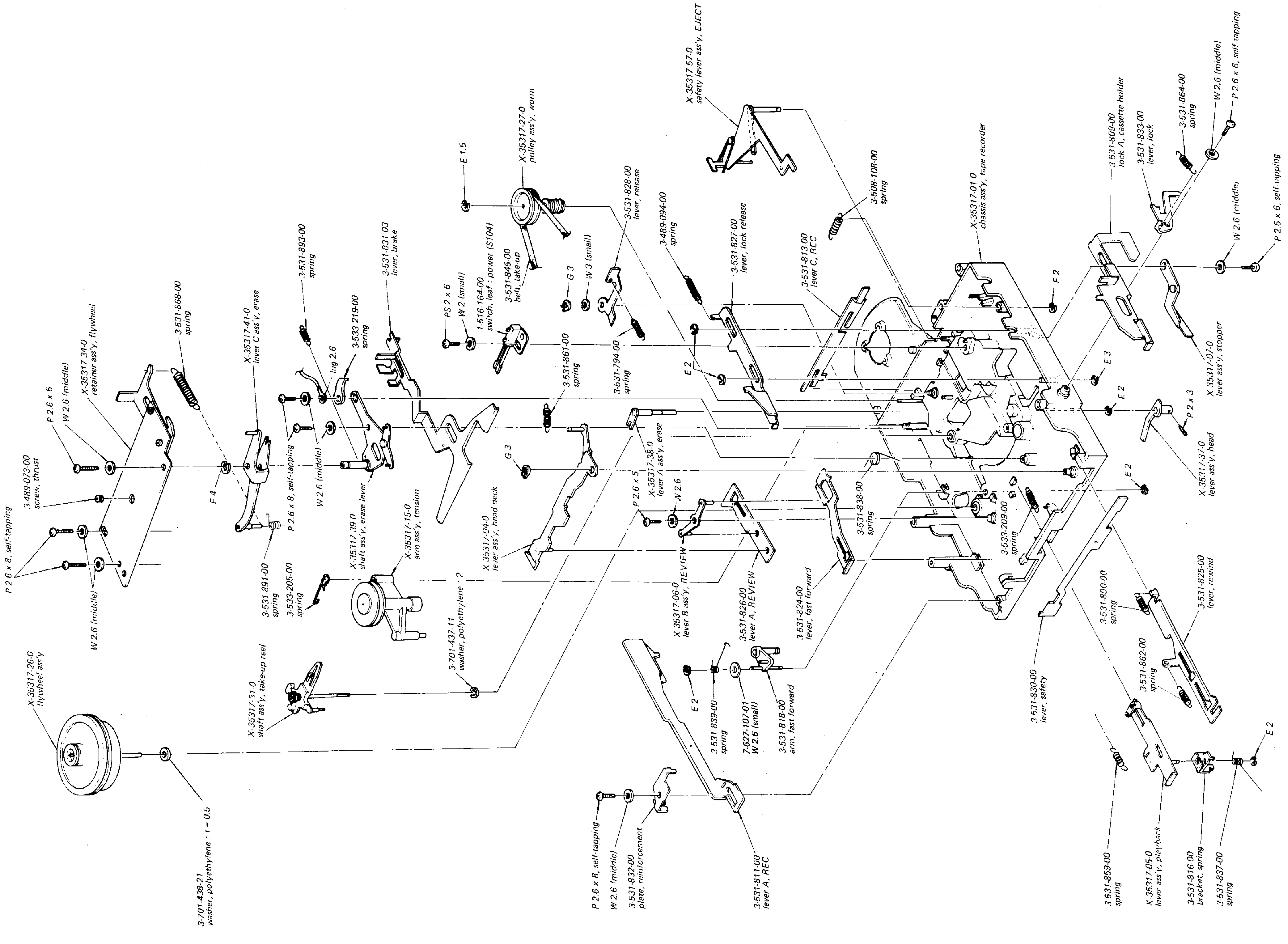
Note: 1. Parts without part numbers and names are not available.
2. All screws are Phillips type (cross recess type) unless otherwise indicated.
(−): slotted head

5-3. CHASSIS – Top View –


suffix
01 (no groove)
11 (+) one groove)
21 (+) two grooves)
31 (–) one groove)
41 (–) two grooves)
(+) groove
(–) groove
8-834-009-01
motor, D-009G
3-531-849-01 ~ 41
pulley, motor
3-531-844-00
belt, capstan
3-485-033-00
case, motor shield
3-531-847-00
sleeve
3-531-846-00
cushion
(–) SC 2 x 3
3-701-437-11
washer, polyethylene : 2
3-462-120-00
cap, supply reel spindle
X-35317-29-0
spindle ass'y, supply reel
3-434-144-00
spring
3-531-857-00
retainer, spring
3-531-851-00
lever, shut-off
3-531-843-00
spring
3-531-858-00
cap, take-up reel spindle
X-35317-73-0
spindle ass'y, take-up; complete;
including;
shaft ass'y, take-up reel
(X-35317-33-4)
retaining ring E-1.5
(X-35317-28-4)
spindle ass'y, take-up reel
X-35317-52-0
lever B ass'y, rewind
E 2
3-531-810-00
lever, safety : erase
X-35317-30-0
brake ass'y, including parts marked ▲
P 2.6 x 12, self-tapping
3-531-873-00
spring
W 2.6
X-35317-81-0
block ass'y, shut-off
3-531-836-00
retainer, cassette
3-531-865-00
spring
3-531-823-00
lever, tension
3-531-812-00
lever B, REC
3-531-850-00
plate, safety : shut-off
W 2.6
W 2.6 (middle)
P 2.6 x 12
3-527-212-00
label, serial No.
X-35317-01-0
chassis ass'y, tape recorder
P 2.6 x 8, self-tapping
W 3
3-531-829-00
retainer, safety plate
P 2.6 x 6, self-tapping
W 2.6
3-531-834-00
retainer, head deck
3-531-892-00
spring
X-35317-37-0
lever ass'y, head
(–) SC 2 x 3
E 2
E 2
X-35317-51-0
pinch roller ass'y
G 2.5
X-35317-09-0
idler ass'y, rewind
3-531-766-00
rubber
3-509-127-00
spring
E 2
X-35317-22-0
idler ass'y, fast forward
P 2.6 x 10, self-tapping
W 2.6 (middle)
3-531-792-00
spring
3-531-790-00
lock, button
X-35317-54-4
button ass'y, REC:
including parts marked △
3-531-815-00
plate, lock release
3-531-793-00
stopper, button
E2
3-531-848-00
roller
3-531-837-00
spring
3-531-816-00
bracket, spring
PS 2 x 6
3-531-886-00
lug
3-531-835-00
retainer, cassette
8-829-336-00
head, record/playback : PP134-36
PS 2.6 x 6
3-531-814-00
bracket, adjustment
3-531-821-00
deck, head
3-531-848-00
roller
☆ 7-623-105-12
W 2 (middle)
☆ 7-682-129-01
P 2 x 12
P 2.6 x 8, self-tapping
W 2.6
3-701-466-00
(±) 2 x 6, w/tooth
3-481-272-00
spring
☆ 8-825-566-00
head, erase : EBF5-02B
X-35317-62-0
head ass'y erase :
including parts marked ☆
3-531-874-00
clamp, head lead
3-533-252-00
Lug
○ 3-531-789-00
bracket, button
○ 3-531-791-00
spring
△ 3-531-879-11
ornament
X-35317-43-7
button ass'y, rewind :
including parts marked ◇
X-35317-43-6
button ass'y, EJECT:
including parts marked ☆
☆ 3-531-797-22
ornament
◇ 3-531-797-02
ornament
X-35317-53-2
button ass'y, stop:
including parts marked
3-531-877-00
ornament
⊕ 3-531-879-01
ornament
X-35317-54-3
button ass'y, forward:
including parts marked ⊕
□ 3-531-797-02
ornament
X-35317-43-7
button ass'y, fast forward :
including parts marked □
X-35317-42-0
button ass'y, complete :
including parts marked ○

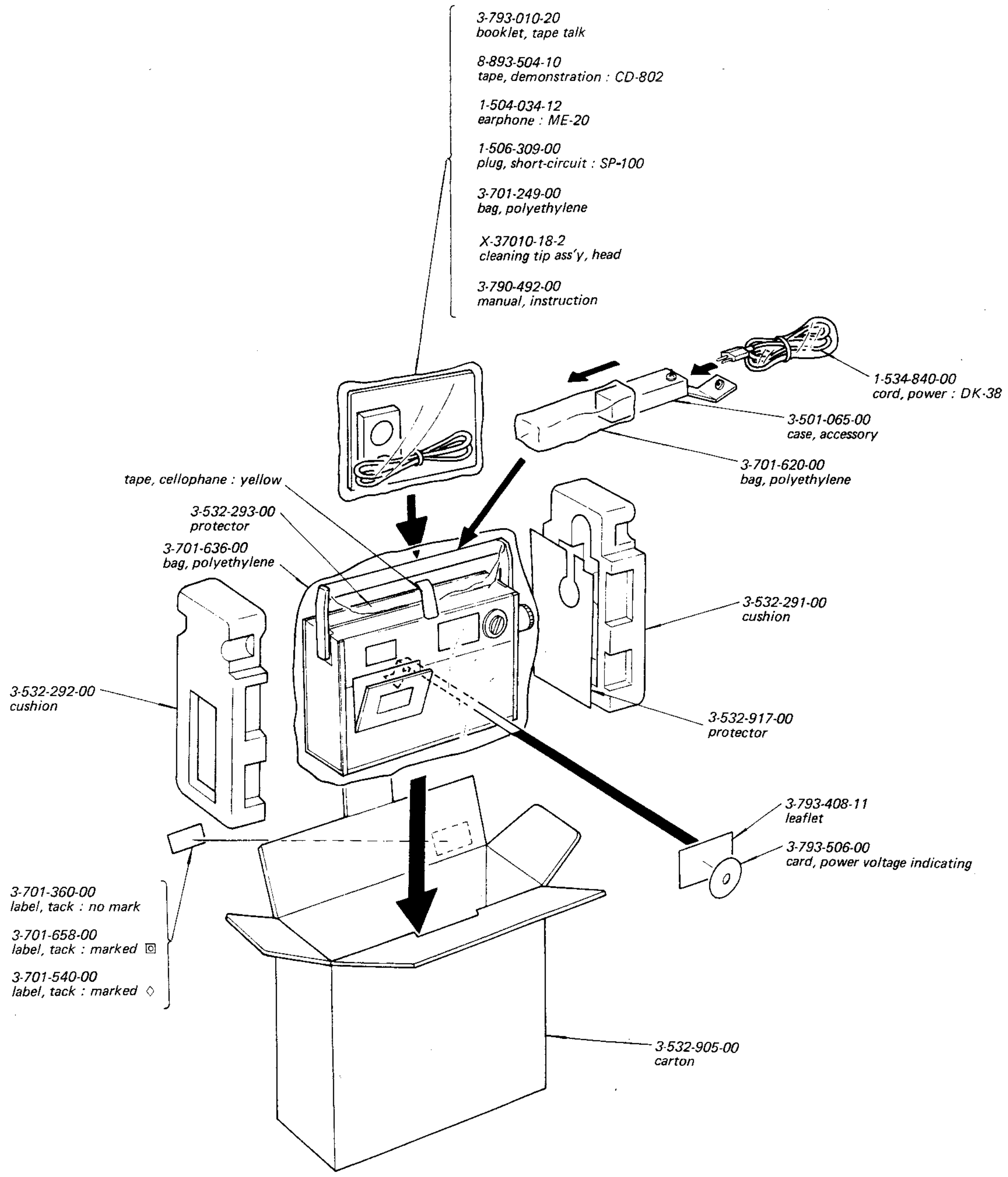
Note: 1. Parts without part numbers and names are not available.
2. All screws are Phillips type (cross recess type) unless otherwise indicated.
(–): slotted head

5-4. CHASSIS – Bottom View –


X-35317-57-0 safety lever ass'y, EJECT
E 1.5
X-35317-27-0 pulley ass'y, worm
3-531-828-00 lever, release
3-489-094-00 spring
3-531-827-00 lever, lock release
3-508-108-00 spring
3-531-813-00 lever, C, REC
X-35317-01-0 chassis ass'y, tape recorder
3-531-809-00 lock A, cassette holder
3-531-833-00 lever, lock
3-531-864-00 spring
W 2.6 (middle)
P 2.6 x 6, self-tapping
W 2.6 (middle)
P 2.6 x 6, self-tapping
E 2
E 3
E 2
P 2 x 3
X-35317-07-0 lever ass'y, stopper
X-35317-37-0 lever ass'y, head
E 2
3-531-845-00 belt, take-up
G 3
W 3 (small)
1-516-164-00 switch, leaf : power (S104)
W 2 (small)
PS 2 x 6
3-531-861-00 spring
3-531-794-00 spring
E 2
3-531-831-03 lever, brake
3-533-219-00 spring
3-531-893-00 spring
lug 2.6
X-35317-41-0 lever C ass'y, erase
3-531-868-00 spring
X-35317-34-0 retainer ass'y, flywheel
W 2.6 (middle)
P 2.6 x 6
3-489-073-00 screw, thrust
P 2.6 x 8, self-tapping
W 2.6 (middle)
E 4
P 2.6 x 8, self-tapping
W 2.6 (middle)
X-35317-39-0 shaft ass'y, erase lever
X-35317-15-0 arm ass'y, tension
G 3
X-35317-04-0 lever ass'y, head deck
X-35317-38-0 lever A ass'y, erase
P 2.6 x 5
W 2.6
3-531-838-00 spring
3-533-209-00 spring
X-35317-06-0 lever B ass'y, REVIEW
3-531-826-00 lever A, REVIEW
3-531-824-00 lever, fast forward
3-531-891-00 spring
3-533-205-00 spring
3-701-437-11 washer, polyethylene : 2
3-531-890-00 spring
3-531-825-00 lever, rewind
3-531-862-00 spring
3-531-830-00 lever, safety
X-35317-26-0 flywheel ass'y
X-35317-31-0 shaft ass'y, take-up reel
E 2
3-531-839-00 spring
7-627-107-01 W 2.6 (small)
3-531-818-00 arm, fast forward
E 2
3-701-438-21 washer, polyethylene : t = 0.5
P 2.6 x 8, self-tapping
W 2.6 (middle)
3-531-832-00 plate, reinforcement
3-531-811-00 lever A, REC
3-531-859-00 spring
X-35317-05-0 lever ass'y, playback
3-531-816-00 bracket, spring
3-531-837-00 spring

Note: 1. Parts without part numbers and names are not available.
2. All screws are Phillips type (cross recess type) unless otherwise indicated.
(–): slotted head

5-5. PACKING


3-793-010-20
booklet, tape talk
8-893-504-10
tape, demonstration : CD-802
1-504-034-12
earphone : ME-20
1-506-309-00
plug, short-circuit : SP-100
3-701-249-00
bag, polyethylene
X-37010-18-2
cleaning tip ass'y, head
3-790-492-00
manual, instruction
1-534-840-00
cord, power : DK-38
3-501-065-00
case, accessory
3-701-620-00
bag, polyethylene
tape, cellophane : yellow
3-532-293-00
protector
3-701-636-00
bag, polyethylene
3-532-291-00
cushion
3-532-292-00
cushion
3-532-917-00
protector
3-793-408-11
leaflet
3-793-506-00
card, power voltage indicating
3-701-360-00
label, tack : no mark
3-701-658-00
label, tack : marked ▣
3-701-540-00
label, tack : marked ◇
3-532-905-00
carton

Note. Parts without part numbers and names are not available.

SECTION 6

ELECTRICAL PARTS LIST

COMPLETE CIRCUIT BOARDS

Ref. No.	*Part No.*	*Description*	
	X-35329-53-0	tape recorder	
	X-35329-51-0	radio	

SEMICONDUCTORS

Ref. No.	*Part No.*	*Description*	
Q1		transistor	2SC710
Q2		transistor	2SC710
Q3		transistor	2SC710
Q4		transistor	2SC710
Q5		transistor	2SC710
Q6		transistor	2SC710
Q7		transistor	2SC710
Q8		transistor	2SC710
Q101		transistor	2SC631A
Q102		transistor	2SC633A
Q103		transistor	2SC631A
Q104		transistor	2SC633A
Q105		transistor	2SC633A
Q106		transistor	2SC633A
Q107		transistor	2SC1364
Q108		transistor	M-8641
Q109		transistor	BX324
D1		diode	1S2139C
D2		diode	1T261
D3		diode	1T261
D4		diode	1T22
D5		diode	1T22
D6		diode	1S1555
D101		diode	1T40
D102		diode	1T22
D103		diode	RD5A
D104		diode	10D2
D105		diode	10D2

COILS

Ref. No.	*Part No.*	*Description*
L1	1-401-460-00	FM ant
L2	1-425-632-00	FM rf
L3	1-407-670-00	1.8 μH, microinductor
L4	1-405-595-00	FM osc
L5	1-401-538-00	SW ant
L6	1-401-539-00	MW ferrite bar antenna
L7	1-405-593-00	SW osc
L8	1-405-301-00	MW osc
L9	1-405-594-00	LW osc
L10	1-407-176-00	390 μH, microinductor
L11	1-407-178-00	1 μH, microinductor
L12		included in MW ferrite bar antenna (L6)
L13	1-401-219-11	loading
L101	1-407-195-00	1 mH, microinductor
L102	1-407-484-00	3.3 μH, microinductor

TRANSFORMERS

Ref. No.	*Part No.*	*Description*
T101	1-423-049-00	meter
T102	1-423-049-00	driver
T103	1-427-351-00	monitor output
T104	1-423-191-00	feedback
T105	1-442-079-00	power
CFT	1-403-144-00	CFT
IFT A	1-403-152-00	AM
IFT F1	1-403-242-00	FM
IFT F2	1-403-244-00	FM
IFT F3	1-403-272-31	FM discriminator
IFT F4	1-403-273-31	FM discriminator

CAPACITORS

All capacitors in μF unless otherwise indicated.
(p = μμ, elect = electrolytic)

Ref. No.	*Part No.*	*Description*		
CT1,2	1-141-097-00	trimmer one unit		
CT3 ~ 8	1-141-151-00	trimmer three units		
VC1 ~ 4	1-151-196-00	tuning		
C1	1-101-890-11	75 p	50 V	ceramic
C2	1-101-882-11	51 p	50 V	ceramic
C3	1-102-943-11	6 p	50 V	ceramic
C4	1-102-960-11	24 p	50 V	ceramic
C5	1-102-941-11	4 p	50 V	ceramic
C6	1-101-923-11	0.01	50 V	ceramic
C7	1-102-938-11	1 p	50 V	ceramic
C8	1-107-135-11	150 p	50 V	silvered mica
C9	1-102-962-11	30 p	50 V	ceramic
C10	1-101-923-11	0.01	50 V	ceramic
C11	1-101-923-11	0.01	50 V	ceramic
C12	1-105-833-12	0.01	50 V	mylar
C13	1-102-943-11	6 p	50 V	ceramic
C14	1-102-673-11	30 p	50 V	ceramic
C15	1-102-943-11	6 p	50 V	ceramic
C16	1-127-045-11	0.1	10 V	solid aluminum elect
C17	1-105-833-12	0.01	50 V	mylar
C18	1-105-833-12	0.01	50 V	mylar
C19	1-105-833-12	0.01	50 V	mylar
C20	1-101-923-11	0.01	50 V	ceramic
C21	1-121-651-11	10	16V	elect
C22	1-105-823-12	0.0015	50 V	mylar
C23	1-101-923-11	0.01	50 V	ceramic
C24	1-105-833-12	0.01	50 V	mylar
C25	1-105-833-12	0.01	50 V	mylar
C26	1-101-923-11	0.01	50 V	ceramic
C27	1-105-837-12	0.022	50 V	mylar

Ref. No.	*Part No.*	*Description*		
C28	1-102-938-11	1 p	50 V	ceramic
C29	1-105-841-12	0.047	50 V	mylar
C30	1-127-049-11	1	10 V	solid aluminum elect
C31	1-121-651-11	10	16 V	elect
C32	1-107-138-11	200 p	50 V	silvered mica
C33	1-107-138-11	200 p	50 V	silvered mica
C34		--------------		
C35	1-105-833-12	0.01	50 V	mylar
C36	1-105-833-12	0.01	50 V	mylar
C37	1-105-837-12	0.022	50 V	mylar
C38	1-105-671-12	0.0068	50 V	mylar
C39	1-105-671-12	0.0068	50 V	mylar
C40	1-127-045-11	0.1	10 V	solid aluminum elect
C41	1-102-102-11	0.0047	50 V	ceramic
C42	1-101-923-11	0.01	50 V	ceramic
C43	1-121-419-11	220	6.3 V	elect
C44		--------------		
C45	1-102-945-11	8 p	50 V	ceramic
C46	1-102-969-11	33 p	50 V	ceramic
C47	1-101-918-11	0.001	50 V	ceramic
C48	1-101-923-11	0.01	50 V	ceramic
C49	1-105-833-12	0.01	50 V	mylar
C50	1-101-923-11	0.01	50 V	ceramic
C51	1-103-888-11	3600 p		styrol
C52	1-102-285-11	10 p	50 V	ceramic
C53	1-107-241-11	360 p	50 V	silvered mica
C54	1-102-951-11	15 p	50 V	ceramic
C55	1-107-132-11	110 p	50 V	silvered mica
C56	1-101-881-11	47 p	50 V	ceramic
C57	1-105-841-12	0.047	50 V	mylar
C58	1-121-413-11	100	6.3 V	elect
C59	1-103-886-11	3000 p		styrol
C60	1-102-941-11	4 p	50 V	ceramic
C61	1-102-956-11	15 p	50 V	ceramic
C80	1-101-923-11	0.01	50 V	ceramic
C81	1-101-923-11	0.01	50 V	ceramic
C82	1-101-923-11	0.01	50 V	ceramic
C83	1-101-923-11	0.01	50 V	ceramic
C101	1-101-881-11	47 p	50 V	ceramic
C102	1-121-651-11	10	16 V	elect
C103	1-127-021-11	0.33	10 V	solid aluminum elect
C104	1-102-110-11	220 p	50 V	ceramic
C105	1-121-391-11	1	50 V	elect
C106	1-121-726-11	0.47	50 V	elect
C107	1-121-726-11	0.47	50 V	elect
C108	1-102-112-11	330 p	50 V	ceramic
C109	1-102-106-11	100 p	50 V	ceramic
C110	1-121-402-11	33	10 V	elect
C111	1-105-833-12	0.01	50 V	mylar
C112	1-121-413-11	100	6.3 V	elect
C113	1-105-681-12	0.047	50 V	mylar
C114	1-127-020-11	0.22	10 V	solid aluminum elect

Ref. No.	*Part No.*	*Description*		
C115	1-121-402-11	33	10 V	elect
C116	1-121-402-11	33	10 V	elect
C117	1-102-106-11	100 p	50 V	ceramic
C118	1-102-106-11	100 p	50 V	ceramic
C119	1-121-413-11	100	6.3 V	elect
C120	1-121-651-11	10	16 V	elect
C121	1-105-677-12	0.022	50 V	mylar
C122	1-105-672-12	0.0082	50 V	mylar
C123	1-127-021-11	0.33	10 V	solid aluminum elect
C124	1-121-413-11	100	6.3 V	elect
C125	1-121-419-11	220	6.3 V	elect
C126	1-121-392-11	3.3	25 V	elect
C127	1-121-651-11	10	16 V	elect
C128	1-121-651-11	10	16 V	elect
C129	1-105-684-12	0.082	50 V	mylar
C130	1-101-889-11	68 p	50 V	ceramic
C131	1-121-651-11	10	16 V	elect
C132	1-121-391-11	1	50 V	elect
C133	1-105-821-12	0.001	50 V	mylar
C134	1-121-425-11	470	10 V	elect
C135	1-121-413-11	100	6.3 V	elect
C136	1-121-419-11	220	6.3 V	elect
C137	1-105-829-12	0.0047	50 V	mylar
C138	1-105-829-12	0.0047	50 V	mylar
C139	1-119-356-11	2200	10 V	elect
C140	1-121-420-11	220	10 V	elect
C141	1-121-420-11	220	10 V	elect
C142	1-101-923-11	0.01	50 V	ceramic
C143	1-101-923-11	0.01	50 V	ceramic
C144	1-102-112-11	330 p	50 V	ceramic
C145	1-102-110-11	220 p	50 V	ceramic
C146	1-121-420-11	220	10 V	elect
C147	1-105-679-12	0.033	50 V	mylar
C148	1-105-709-12	0.0047	50 V	mylar
C149	1-102-106-11	100 p	50 V	ceramic
C150	1-102-106-11	100 p	50 V	ceramic
C151	1-105-679-12	0.033	50 V	mylar
C152	1-102-106-11	100 p	50 V	ceramic
C153	1-101-918-11	0.001	50 V	ceramic

RESISTORS

All resistors are ¼W, carbon type and in Ω unless otherwise indicated. (k = 1,000)

R1	1-242-726-11	160 k
R2	1-244-670-11	750
R3	1-244-723-11	120 k
R4	1-244-675-11	1.2 k
R5	1-242-653-11	150
R6	1-242-673-11	1 k
R7	1-244-673-11	1 k
R8	1-242-709-11	33 k
R9	1-242-632-11	20
R10	1-244-721-11	100 k

Ref. No.	*Part No.*	*Description*
R11	1-244-661-11	330
R12	1-244-714-11	51 k
R13	1-244-659-11	270
R14	1-244-672-11	910
R15	1-242-653-11	150
R16	1-244-708-11	30 k
R17	1-244-673-11	1 k
R18	1-244-653-11	150
R19	1-242-721-11	100 k
R20	1-242-651-11	120
R21	1-242-658-11	240
R22	1-244-697-11	10 k
R23	1-244-666-11	510
R24	1-242-673-11	1 k
R25	1-244-713-11	47 k
R26	1-244-697-11	10 k
R27	1-242-658-11	240
R28	1-242-673-11	1 k
R29	1-242-727-11	180 k
R30	1-242-666-11	510
R31	1-244-657-11	220
R32	1-242-657-11	220
R33	1-242-673-11	1 k
R34	1-242-673-11	1 k
R35	1-242-713-11	47 k
R36	1-242-693-11	6.8 k
R37	1-242-673-11	1 k
R38	1-244-713-11	47 k
R39	1-244-706-11	24 k
R40	1-244-695-11	8.2 k
R41	1-244-695-11	8.2 k
R42	1-244-721-11	100 k
R43	1-242-673-11	1 k
R44	1-244-690-11	5.1 k
R45	1-244-637-11	33
R46	1-244-728-11	200 k
R47	1-244-672-11	910
R48	1-242-684-11	3 k
R49	1-242-660-11	300
R50	1-242-664-11	430
R51	1-242-657-11	220
R52	1-242-661-11	330
R53	1-242-640-11	43
R101	1-244-684-11	3 k
R102	1-244-721-11	100 k
R103	1-244-677-11	1.5 k
R104		---------------
R105	1-244-679-11	1.8 k
R106	1-244-689-11	4.7 k
R107	1-242-737-11	470 k low noise
R108	1-244-659-11	270
R109	1-244-697-09	10 k low noise

Ref. No.	*Part No.*	*Description*
R110	1-244-685-11	3.3 k
R111	1-242-705-11	22 k
R112	1-242-669-11	680
R113	1-242-715-11	56 k
R114	1-242-707-09	27 k low noise
R115	1-242-707-11	27 k
R116	1-242-638-11	36
R117	1-244-701-09	1.5 k low noise
R118	1-242-653-11	150
R119	1-242-665-11	470
R120	1-244-689-11	4.7 k
R121	1-244-694-11	7.5 k
R122	1-244-686-11	3.6 k
R123	1-244-693-11	6.8 k
R124	1-242-659-11	270
R125	1-244-649-11	100
R126	1-244-655-11	180
R127	1-244-653-11	150
R128	1-244-649-11	100
R129	1-244-677-11	1.5 k
R130	1-242-689-11	4.7 k
R131	1-244-687-11	3.9 k
R132	1-244-733-11	330 k
R133	1-244-709-11	33 k
R134	1-242-705-11	22 k
R135	1-244-675-11	1.2 k
R136	1-244-687-11	3.9 k
R137	1-242-709-11	33 k
R138	1-242-697-11	10 k
R139	1-244-691-11	5.6 k
R140	1-224-096-00	10 k (C), slide variable; TONE
R141	1-222-534-00	10 k (A), slide variable; VOLUME
R142	1-244-681-11	2.2 k
R143	1-244-649-11	100
R144	1-244-707-11	27 k
R145	1-244-707-11	27 k
R146	1-244-707-11	27 k
R147	1-244-707-11	27 k
R148	1-244-697-11	10 k
R149	1-244-629-11	15
R150	1-242-705-11	22 k
R151	1-242-661-11	330
R152	1-244-624-11	11
R153	1-244-673-11	1 k
R154	1-244-609-11	2.2
R155	1-244-609-11	2.2
R156	1-244-639-11	39
R157	1-244-649-11	100
R158	1-244-730-11	240 k
R159	1-244-687-11	3.9 k
R160	1-244-712-11	43 k
R161	1-242-619-11	5.6
R162	1-242-635-11	27

Ref. No.	*Part No.*	*Description*
R163	1-242-635-11	27
R164	1-242-691-11	5.6 k
R165	1-242-691-11	5.6 k
R166	1-244-689-11	4.7 k
R167	1-244-689-11	4.7 k
R168	1-242-657-11	220
R169	1-244-633-11	22

SWITCHES

S1	1-516-256-00	rotary, band selector
S2	1-516-257-00	slide, AFC/ISS
S101	1-516-186-00	slide, RADIO
S102	1-514-813-22	slide, record/playback
S103		included in lamp switch ass'y (X-35329-84-0)
S104	1-516-164-00	leaf, power
S105		included in power connector (CNJ102)
S106		included in REC/PB connector (J106)
S107	1-516-174-00	rotary, voltage selector

JACKS

J101	1-507-392-00	6-units:	MIC
J102			REMOTE
J103			LINE IN
J104			LINE OUT
J105			MONITOR
CNJ101			DC IN 6 V

Ref. No.	*Part No.*	*Description*
J106	1-508-615-00	connector, REC/PB w/switch S106
CNJ102	1-509-510-00	connector, power

MISCELLANEOUS

	8-829-336-00	head, record/playback: PP134-36
	8-825-566-00	head, erase: EBF5-02B
	8-834-009-01	motor, D-009G
	1-464-007-00	unit, bias osc
	1-527-184-11 ~ 15	filter, ceramic
	1-502-419-00	speaker
	1-501-072-00	antenna, telescopic
	8-814-191-11	MICROPHONE, electret condenser: C-1002S
	1-518-095-13	lamp, 6 V: 35 mA: dial
	1-520-136-00	meter, REC/BATT
F1	1-532-084-00	fuse, 100 mA: primary
F2,3	1-532-080-00	fuse, 800 mA: secondary
	1-533-037-00	holder, fuse: secondary
	1-533-102-00	holder, fuse: primary
	1-536-181-00	terminal strip, 2L1
	1-535-047-00	terminal, solderless
	1-535-050-00	connector, circuit board

SECTION 7

HARDWARE

SCREWS

Part No.	*Description*	
7-621-255-15	P 2 x 3	
7-621-255-67	P 2 x 10	
7-621-259-25	P 2.6 x 4	
7-621-259-45	P 2.6 x 5	
7-621-259-72	P 2.6 x 12	
7-621-720-46	P 2 x 8	self-tapping
7-621-721-52	P 2.6 x 4	self-tapping
7-621-721-61	P 2.6 x 5	self-tapping
7-621-721-71	P 2.6 x 6	self-tapping
7-621-721-81	P 2.6 x 8	self-tapping
7-621-721-91	P 2.6 x 10	self-tapping
7-621-722-02	P 2.6 x 12	self-tapping
7-621-773-86	B 2.6 x 4	
7-628-154-15	PS 2.6 x 6	
7-628-253-25	PS 2 x 6	
7-682-129-01	P 2 x 12	
7-682-135-01	P 2.6 x 6	
7-682-547-04	B 3 x 6	
7-682-624-01	PS 2 x 4	
7-682-626-01	PS 2 x 4	
7-682-646-01	PS 3 x 5	
7-682-647-01	PS 3 x 6	
7-682-655-01	PS 3 x 30	
7-682-946-01	PSW 3 x 5	
7-682-947-01	PSW 3 x 6	
7-682-948-01	PSW 3 x 8	
7-683-126-00	(–) SC 2 x 3	
7-685-145-01	P 3 x 6	self-tapping
7-685-145-51	P 3 x 6	self-tapping
7-685-146-21	P 3 x 8	self-tapping
7-685-446-21	T 3 x 8	self-tapping
7-685-547-24	B 3 x 10	self-tapping

WASHERS

Part No.	*Description*	
7-623-105-01	2	(small)
7-623-105-11	2	(middle)
7-623-105-12	2	(middle)
7-623-107-12	2.6	(middle)
7-623-107-19	2.6	(middle)
7-623-108-12	3	
7-623-112-19	5	(middle)
7-623-208-21	3	spring
7-623-412-01	5	external tooth
7-623-710-37	6	wave
7-623-107-01	2.6	(small)

NUTS

Part No.	*Description*
7-622-205-02	2
7-684-025-01	5

LUGS

Part No.	*Description*
7-623-505-01	2
7-623-505-11	2
7-623-507-11	2.6
7-623-508-11	3

RETAINING RINGS

Part No.	*Description*
7-624-102-01	E 1.5
7-624-104-01	E 2
7-624-106-01	E 3
7-624-108-01	E 4
7-624-171-41	G 2.5
7-624-171-51	G 3

DIAL CORD

Part No.	*Description*
7-632-120-52	0.25

EYELET

Part No.	*Description*
7-623-606-01	1.3 x 3

— Hardware Nomenclature —

P – Pan Head Screw ⊕

PS – Pan Head Screw with Spring Washer ⊕

K – Flat Countersunk Head Screw ⊕

B – Binding Head Screw ⊕

RK – Oval Countersunk Head Screw ⊕

T – Truss Head Screw ⊕

R – Round Head Screw ⊕

F – Flat Fillister Head Screw ⊖

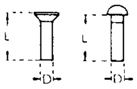
SC – Set Screw ⊖

E – Retaining Ring (E Washer)

W – Washer
SW – Spring Washer
LW – Lock Washer
N – Nut

– Example –

Type of Slot
⊕ P 3x10
Length in mm (L)
Diameter in mm (D)
Type of Head



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